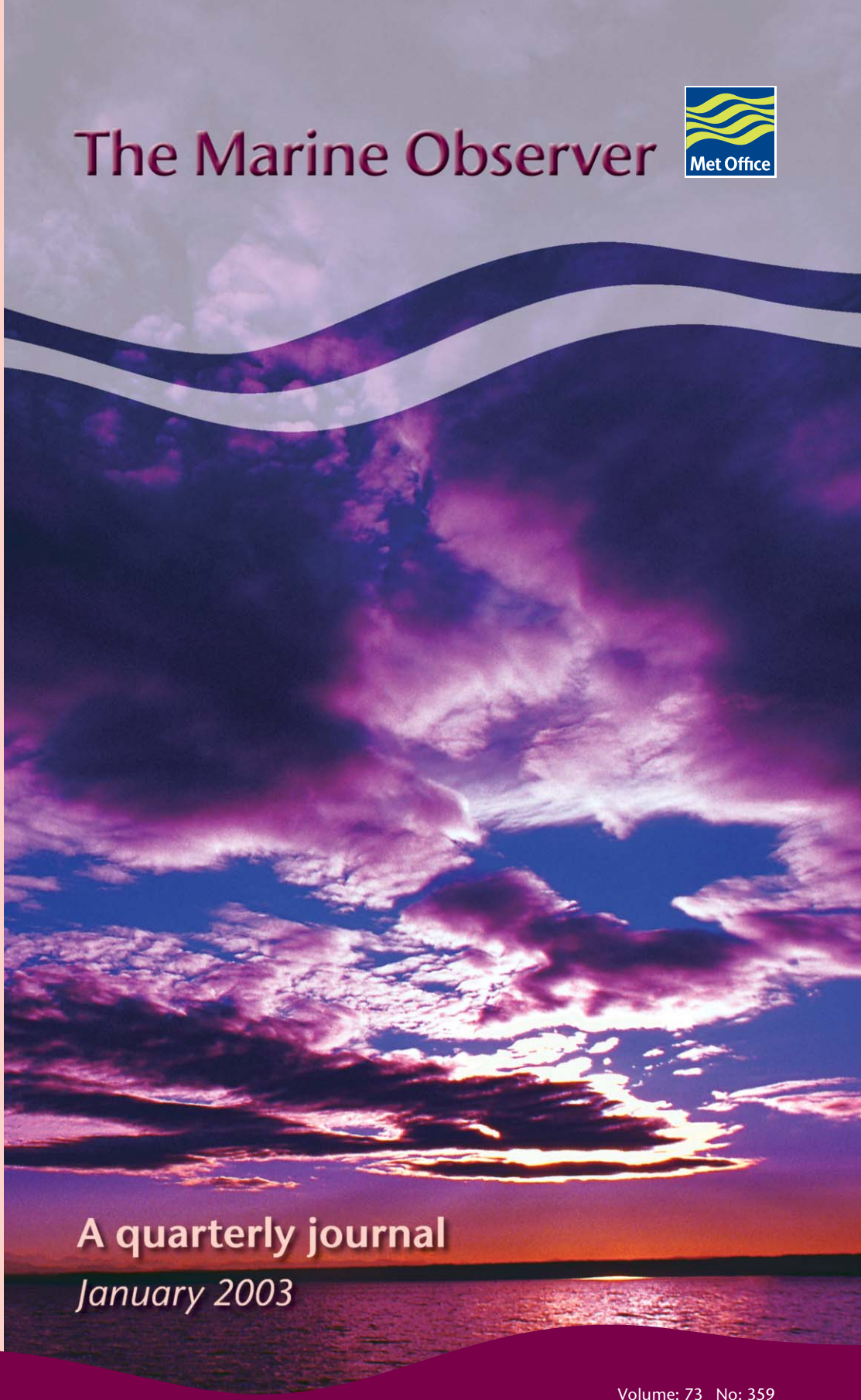
The Marine Observer



A quarterly journal

January 2003

Volume: 73 No: 359

The Marine Observer is a quarterly journal produced by the Met Office. All correspondence should be addressed to :

The Editor 'The Marine Observer'
Met Office
Beaufort Park
Easthampstead
Wokingham
Berkshire
RG40 3DN
United Kingdom

Fax: +44 (0)1344 855873
E-mail: obsmar@metoffice.com
http://www.metoffice.com

Contributors are reminded that all photographs should carry clear identification of source, and that texts may be subject to alteration at the discretion of the Editor.

Views and opinions expressed within articles in this publication are those of authors alone.

The Met Office holds no responsibility for the maintenance or content of any internet web-site, other than its own, that may be named in this publication.

The Marine Observer

Vol. 73 No. 359 January 2003

Contents

Regulars

01 Editorial

03 The Marine Observers' Log. *A selection of the normal and the more unusual sightings at sea drawn from ships' logs.*

17 Ships named in this issue

19 Scene at sea. *Observers' camera-work.*

46 Postbag

47 Book reviews

49 Noticeboard

Awards to UK Voluntary Observers and ships

Fleetlist updates

Corrections

Features

15 Whale-size sharks are no 'fishermen's tales'. *They really are 'that' big.*

18 Summary of cetacean sightings made by observers on UK Voluntary Observing Ships.

20 Dazzling insects visit the *Arunbank*.

21 Playing 'tag' with giant sharks. *Keeping track of sharks at sea.*

25 A dirty planet is a happy planet. *How research is showing that there is more to dust than meets the eye.*

28 El Niño — causes, consequences and solutions. *A prize-winning essay on this complex phenomenon.*

34 El Niño outlook. *WMO considers the status of the current cycle.*

37 Ship observations and the Met Office. *How the UK VOF has developed since the days of Vice-Admiral FitzRoy.*

45 Hurricane 'Lili' whisks the Gulf of Mexico. *Remotely-sensed data offer a picture of the storm from above and at the surface.*

LONDON: THE STATIONERY OFFICE

©2003 02/0754

Editorial

Probable nor'-east to sou'-west winds, varying to the southard and westard and eastard and points between; high and low barometer, sweeping round from place to place; probable areas of rain, snow, hail, and drought, succeeded or preceded by earthquakes with thunder and lightning.

Mark Twain (1876)
(Speech at dinner of New England Society. New York, 22 December)

Mark Twain was speaking with some humour about the vagaries of the New England weather, but such meteorological variety also applies to the marine environment (with the exception, perhaps, of earthquakes!). At sea, knowing what to expect, and where and when to expect it gives the mariner the edge when planning ship movements. With the knowledge gained from gale warnings, forecasts and weather charts, all of which are received through regular scheduled transmissions, informed decisions can then be made about the prevailing and expected conditions.

Fine — but how do these products originate?

Observers on voluntary observing fleets of all participating countries are members of one vast force communicating raw meteorological information to the shore. Collectively, ships, buoys and land-based observers worldwide contribute many thousands of surface or upper-air observations.

The reports, rather like the pieces of a jigsaw puzzle, are passed to national meteorological centres, where they are processed to create analysis charts while also being assimilated into computer models which update the picture of the atmosphere's behaviour. Analyses, and forecast products generated by the models, complete the picture of current and expected conditions. Myriad pieces of raw weather data, backed by elements remotely-sensed by satellite, are thus converted to meteorological information ready for transmission back to the users.

The key to the quality of transmitted information lies in the accuracy and timeliness of its receipt from the observers. Forecasting staff worldwide would willingly accept a single, timely, accurate observation than try to work with a dozen late arrivals containing errors. This applies to all types of observation — from land, sea or air.

The development of the automated coding software offers a healthy step forward in the pursuit of the perfectly timed 'perfect ob' from ships, while drifting and moored buoys provide high-quality data from 'data sparse' areas. Elsewhere, closely monitored ships observing within the VOSClim Project will provide a subset of high-quality data that will have uses in the verification of satellite data, and for studies into climate change and climate prediction.

With the continued co-operation of observers, particularly those at sea, weather services and products will continue to improve. Forecasters are ready and waiting to receive ships' observations, and mariners should never be tempted to believe that a report of 'nil weather from the middle of nowhere' will be of little use.

To all observers in the UK Voluntary Observing Fleet we extend our thanks for your weather reports during the past year, our best wishes for 2003 — and please keep those observations coming!

The Marine Observers' Log

This section of *The Marine Observer* comprises reports of interest and scientific value which have originated from the following sources:

- completed ships' meteorological logbooks or individual correspondence;
- e-mails and CDs direct from ships, or from individual observers ;
- additional observations files associated with TurboWin records;

All reports are welcome in the Observations Supply section of the Met Office and, wherever possible, they are forwarded to relevant sources of expertise for comment and analysis. Reports are also welcome from ships recruited to observing fleets other than that of the UK. The following list includes many of the normal and some of the more unusual subjects reported from ships at sea — the list is by no means exhaustive, and we always hope for additions:

- tropical storms, hurricanes and typhoons, depressions and squalls
- waterspouts and funnel clouds
- electrical phenomena and thunderstorms
- dust and sand
- fog and fogbanks
- currents, tide rips, whirlpools and disturbed water, extreme waves
- marked changes in sea temperature
- earthquakes and volcanoes, seaquakes
- birds, bats and insects
- whales, dolphins and other mammals such as seals and manatees
- sea snakes, turtles
- fish and other marine life
- bioluminescence, milky seas, phosphorescent wheels
- optical phenomena such as haloes, rainbows, fogbows, coronae, refraction
- crepuscular rays, 'flash' phenomena and noctilucent clouds
- comets, meteors, meteorite showers, eclipses
- sunspots, the aurora, satellites and 'UFOs'

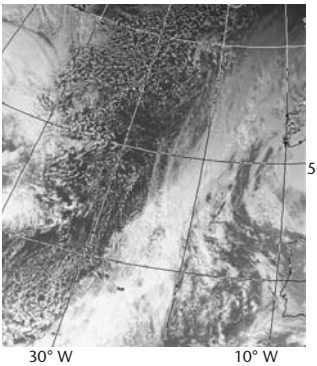
All temperatures in this publication are given in degrees Celsius unless otherwise stated, and the barometric pressure is given in millibars (mb) although the standard international unit is the hectopascal (hPa) which is the numerical equivalent. Where mentioned, 'mile' and 'miles' are to be taken as the nautical measurement.

m.v. *Repulse Bay*

- **7 January 2002**
- **Captain K.S. Hardy**
- **North Atlantic Ocean**
- **Observer: C.J. Hughes (2nd Officer)**

Passage of front: During the afternoon a long low bank of cloud was seen 10 miles ahead, stretching from horizon to horizon in a roughly north-south direction. The sky beyond it appeared to be much lighter than at the ship. On a heading of 103° whilst on passage from Halifax NS to Malta, the vessel passed under the cloud in position 38° 09.69′ N, 21° 51.99′ W at 1650 UTC. At this time the cloud cover was eight octas of cumulus and stratocumulus at different levels.

The cloud bank was found to be only half a mile wide with a base of not more than 500 feet, and did indeed stretch to both horizons. The impression gained was of passing under a very long low bridge, and there was a very light drizzle for just a few seconds while beneath it. The air temperature then rose in a matter of seconds from 16.5° to 17.4° while the wet-bulb temperature rose from roughly 14.5° to 16.2°. For an hour prior to the ship's meeting with the front, the wind had been variable but mainly W'ly, force 2, but on passing it the direction changed immediately to S'ly, force 2, increasing over the next hour to force 3. Visibility before the front had been at least 15 miles, but immediately on passing it this fell to five miles and, after an hour, there was light patchy drizzle.



Above: *Visible image* for 1506 UTC on 7 January 2002, showing part of a long weather front in the North Atlantic.*

This was obviously part of the front which had been watched on the weatherfax charts during the last few days. Looking back at the cloud formation of this front it was seen to comprise towering cumulus of very great height.

[* Image courtesy of Dundee Satellite Receiving Station, Dundee University, Scotland: www.sat.dundee.ac.uk/]

m.v. *British Pioneer*

- **22 January 2002**
- **Captain A. MacLeod**
- **Mediterranean Sea**
- **Observers: Captain MacLeod**
  C. Kelly (2nd Officer)
  A. Waller (Cadet)
  M. Rodollo (AB)

Whales and dolphins: The vessel was heading east, passing through the Strait of Gibraltar in position 35° 54′ N, 05° 59′ W en route from Coryton to Sidi Kerir. At 1330 UTC a pod of pilot whales was noticed passing at 50 m down the port side. They appeared to be short-finned pilot whales and were heading out of the Mediterranean into the North Atlantic. In total there were 10–15 individuals each about 3 m long, and were observed 'logging' at the surface.

Around 10 minutes later another pod appeared, blowing, approximately 500 m from the vessel. On closer inspection these were found to be accompanied by five to 10 common dolphins. At the time of the sightings the wind was SW'ly, force 4, the sky was clear and there was a swell of one metre.

m.v. *P&O Nedlloyd Kobe*

- **27 January 2002**
- **Captain K. Worthington**
- **Banda Sea**
- **Observer: D.J. Newnes (Chief Officer)**

Tide rips: On passage from Port Klang to Suez, the ship was six miles north-west of Pulau Rondo at 1130 UTC and entering the Indian Ocean, when a series of strong tide rips was encountered. Observed lying north–south, these rips were visible on radar to a range of five miles, while visually they could be seen stretching from one horizon to the other. It was also found that they extended westwards (along the ship's heading) for about five miles. At the time of the observation the NE'ly wind of force 3 veered to SE'ly while the ship's ground speed was reduced by approximately one knot. The effect of the rips on the ship's steering was evident. It was thought that they were likely to have occurred at the zone of convergence of the northerly current west of Sumatra with the west-going current emerging from the northern end of the Strait of Malacca.

m.v. *Colombo Bay*

Sea smoke: At 1300 UTC on 5 February 2002, sea smoke was encountered in position 36° 44′ N, 74° 09′ W, forming 'tufts' of smoke-like fog that skimmed the sea surface in the high winds, and swirled around in the turbulent air produced by the vessel. The observers also noticed several 'waterspout' shapes forming in the distance where the cloud base met the level of the sea smoke. The phenomenon continued until the wind speed decreased later in the afternoon. During the period of observation the wind was NW'ly, force 8 while the sea temperature was 18.1° and the air temperature a mere 1.5°.

m.v. *P&O Nedlloyd Kobe*

- **5 February 2002**
- **Captain J.L. Peterson**
- **Indian Ocean**
- **Observers: I. Renders (2nd Officer) J. Serrano (AB)**

'St Elmo's fire': At 2100 UTC whilst on a west-north-westerly heading between Singapore and Suez, a band of cloud lying north-south was observed visually and by radar, and sheet lightning was seen with it. On passing beneath the cloud, the distinct crackling noise of St Elmo's fire (corposants) could be heard outside the bridge and was duly investigated by the Officer on Watch.

The effects could be seen on all whip aerials and the outside corners of the bridge wings and, on approaching the bridge wing to a distance of 3 m, the officers' head hair started to 'stand on end'. When they lifted their hands, blue 'flames' erupted from their fingertips. It seemed as if the discharge was situated on a line from the monkey island to the edge of the bridge wing. Below this line no 'static' was found.

When the lookout pointed his finger at the sky he was very surprised and concerned to see the flame emanating from its tip — he had not encountered the phenomenon before. Various metal objects, such as brass dividers and a metal ruler, were pointed at the sky to try and increase the length of the emerging flame, but it remained largely unchanged.

At the time of the observation the wind was ENE'ly, force 4, the pressure was 1010.2 mb and the ship's position was 08° 30′ N, 70° 30′ E.

Editor's note. Observers on the *Providence Bay* also sent in a report of corposants experienced on 25 August 2002 at 0320 UTC whilst in position 37° 27.79′ N, 74° 29.29′ W. Third Officer J.J. Southam, Cadets A.R. May and L.C. Turner, and E. Dayandayan (AB) were treated to blue fingertips and glowing blue hair, while one of the cadets transmitted a small shock to the Third Officer. The vessel had been navigating close to an electrical storm prior to the observation, and there was light precipitation at the time of the event.

m.v. *British Purpose*

Bioluminescence: 13 February 2002 at 1600 UTC. Bioluminescence was sighted when the ship was off the coast of Oman in position 17° 14′ N, 57° 51′ E. At this time the sea surface turned to a very light, dense (almost milky) colour that extended all around the vessel and to the horizon. To add to the effect, the night was a pitch-black with no cloud or moon and little starlight. The display was watched for 40 minutes by Captain K.E. Peacock, Chief Officer H. Cromie and Third Officer C. Nesbitt before it faded away. On the 26th at 0930, when south-east of Fujairah, bright-green bioluminescence occurred in the bow wave and down the entire length of the ship.

m.v. *Shenzhen Bay*

- **15 February 2002**
- **Captain D.W. Lax**
- **North Pacific Ocean**
- **Observers: Captain Lax**
  R.K. Harding (Chief Officer)
  J.A. Weber (2nd Officer)
  A. Graham (3rd Officer)
  Members of ship's company

Passage of depressions: At 0930 UTC, a weather fax was received from Campsac Point Reyes that showed an area of low pressure to the north-west of the vessel, with a cold front expected to pass overhead at approximately 1200.

As indicated in the table of ship's observations (below), it was thought that the cold front passed over the vessel at around 1300, with the lowest pressure of 1002.6 mb being recorded at 1400. The ship's position at that time was 44° 26′ N, 141° 34′ W.

Time	*Temperature*			*Pressure*	*Wind*		*Weather*
(UTC)	*Air*	*Wet*	*Sea*		*Dir'n*	*Force*	
0900	8.1	7.3	7.8	1010.9	S	7	Overcast
1200	8.7	8.2	8.6	1004.0	SxE	7	Overcast. Heavy swell.
1300	—	—	—	—	—	—	Front passing.
1600	—	—	—	1008.1	NW	8	Overcast. Heavy swell.
1800	—	—	—	1012.8	NW	8	Cloudy, showers. Rough sea.
2200	5.6	3.5	9.4	1018.6	NW	9	Cloudy. Rough sea, heavy swell.

Another weather fax then revealed a second depression heading towards the vessel. The weather conditions were still being monitored on an hourly basis, and the predicted positions of the vessel and the warm front were plotted on the fax. From this the observers estimated that the depression would start to pass over the ship at 1800 on the 16th. The following observations were made during the passage of this depression.

Time	*Temperature*			*Pressure*	*Wind*		*Weather*
(UTC)	*Air*	*Wet*	*Sea*		*Dir'n*	*Force*	
0200	6.8	3.8	9.2	(Rising)	NW	6	Cloudy. Mod sea.
0800	—	—	—	1023.7	S	5	Cloudy
1500	8.5	7.4	9.9	1011.9	S	8/9	Overcast, showers. very rough sea, heavy swell.
1600	—	—	—	1008.4	SxE	9	
1700	—	—	—	1007.4	SW	8	
1900	10.0	9.4	9.3	1008.1	—	—	Overcast, mod visibility. Rough sea, heavy swell.
2100	—	—	—	1011.1	NW	8	Overcast
2300	9.5	8.6	9.4	1013.4	WxN	6	Overcast, good visibility. Rough sea, heavy swell.

The lowest pressure recorded was 1007.4 mb at around 1600. Conditions at the ship remained unchanged until the passage of the cold front, after which the weather improved slightly as the wind veered. The ship's position at 1600 on the 16th was 41° 12′ N, 151° 35′ W.

m.v. *Oriana*

- **6 March 2002**
- **Captain R.D. Fennelow**
- **South Pacific Ocean**
- **Observers: B. Dillon (3rd Officer)**
  T. Jennings (Coxwain)
  L. Sara (Cadet)

Meteorite: At around 0510 GMT whilst in position 06° 13.1′ S, 167° 56.33′ W on a course of 020° between Pago Pago and Honolulu, .a very large object — appearing to burn very brightly in the atmosphere — was observed.

It was first noted at an altitude of 15° above the horizon in the north-west, plummeting rapidly in a north-westerly direction. The observation lasted four seconds before the object disappeared just above the horizon. The sky at the time was overcast but the light was clearly visible through the clouds. The magnitude of the object was

m.v. *British Spirit*

similar to that of the moon, the object was off-white in colour with a glow around it.

Dolphins: 7 March 2002 at 1410 UTC. In calm conditions, a number of dolphins were sighted from two points on the starboard bow to the same angle on the port bow of the ship. They seemed to be 'playing' in a certain area and, on closer inspection, were found to number 50–60 adults with 20–30 juveniles. Having dark-grey 'boot topping' and light-grey 'anti-fouling' they were assumed by those on board to be bottlenose dolphins. As the vessel passed through the group about 20 of them suddenly leapt in the air at the

m.v. *Repulse Bay*

- **16 March 2002**
- **Captain K.S. Hardy**
- **Indian Ocean**
- **Observers: Captain Hardy Members of ship's company**

same moment that an air-driven gas freeing fan was started on the maindeck. Coincidence or what? The ship's position at the time was 13° 18′ N, 57° 02′ E.

Waterspouts: The ship was stopped in position 06° 14′ N, 92° 21′ E for ETA purposes whilst on passage from Singapore to Colombo. A heavy rain shower was observed approaching the vessel at about 0145 UTC and, on closer inspection it was noticed that there was an amount of disturbed surface water with it. This gradually became a waterspout.

As it approached the ship it started to become less developed as it then passed astern at a distance of about 100 m. As the waterspout drew away, its intensity increased and the speed of rotation picked up. The air temperature at the time was 28.8°, the wet bulb was 25.7° while the sea temperature was 29.0°, decreasing to 28.8° as the spout passed

m.v. *Maersk Rapier*

- **18 March 2002**
- **Captain R. Wiseman**
- **South Atlantic**
- **Observers: Captain Wiseman Members of ship's company**

by. There was a NExN'ly wind of force 3. Shortly afterwards another rain squall approached from the north, this one being preceded by three smaller waterspouts, one of which was noted to be 'skipping' across the sea at quite a rate.

Bird: At approximately 1130 UTC during a passage from Ascension Island to the Falkland Islands, a white egret was seen flying about the ship, apparently looking for a landing place. It was not sighted in the air after 1300, and was assumed to have landed by that time. It was later spotted at 1530 near the rescue boat on the port side aft, clinging on to a scupper lip while being battered by the wind.

The Cook was alerted — and he sheltered the bird in a large box inside the accommodation area. Confirmed as being a cattle egret, it appeared to be exhausted and was rested for 24 hours. It was then taken up on deck, but since it showed no inclination to leave the hand it was returned to the box for a further 24 hours. It then escaped and started to explore its surroundings although still showing little intention

m.v. *Sea Amethyst*

of leaving the shelter of the accommodation.

On 28 March, when in sight of the Falkland Islands, the egret finally decided that it was time to leave.

R.R.S. *Ernest Shackleton*

- **23 March 2002**
- **Captain S.J. Lawrence**
- **Scotia Sea**
- **Observer: D. Leask (3rd Officer)**

Aurora borealis: 18/19 March 2002, between 0030 UTC and 0035. The aurora borealis was sighted briefly, appearing above a low band of horizon cloud, and covering an arc from 280°–040°. It was distinctive owing to its red colour. The ship's position was 54° 51.1′ N, 09° 35.6′ W.

Adverse current: Between 0930 UTC and 1000 in approximate position 56° 14′ S, 57° 41′ W in the region of the convergence zone, the vessel experienced an adverse current, setting the ship to the East. The current was running at 086° x 2.5 knots.

The ship was conducting a scientific cruise between Antarctica and Stanley, and was in very rough weather — the wind force was steady between 8 and 9, reaching gusts of 50 knots. An allowance of -4° was made to the vessel's course of 356°, and the ship was steady. During the above period the vessel was set significantly to the east and an extra -8° set had to be allowed for the current.

Also noted was a rapid increase in the sea-water temperature, which rose by 2.6° over four hours! The following observations were taken:

Time	*Temperature*		*Pressure*	*Wind*	
UTC	*Air*	*Sea*		*Dir'n*	*Force*

m.v. *British Pride*

0700	4.3	2.8	997.7	WxS	9
1100	5.4	5.4	1001.0	WSW	8/9
1300	5.9	5.9	1002.1	WSW	8/9

By 1300 the vessel was experiencing less current and coming back to track.

Waterspout: 23 March 2002 at 1340 UTC. A waterspout was observed by Cadets M. Macleod and M. Bayliss, and Chief Officer M. Cumpstey. It was vertical with a small

m.v. *Toisa Coral*

- **29 March 2002**
- **Captain K.J. McClymont**
- **Western North Pacific**
- **Observers: Captain McClymont C. Williams (Chief Engineer)**

diameter at sea level, but widened where it joined the cloud. There was no disturbance of the sea surface, and the waterspout lasted for no more than five minutes. The sky was completely covered by small cumulus, stratocumulus and towering cumulonimbus, and there were light rain showers after the waterspout had disappeared. The sighting was in position 04° 30′ S, 07° 03′ E.

Whales: The vessel was in position 22° 37′ N, 121° 23′ E on a heading of 205° whilst on passage between Keelung and Singapore.

At 2320 UTC when three miles off the island of Lu Tao, and where the water depth was 1,200 m, two large splashes were observed approximately half a mile ahead.

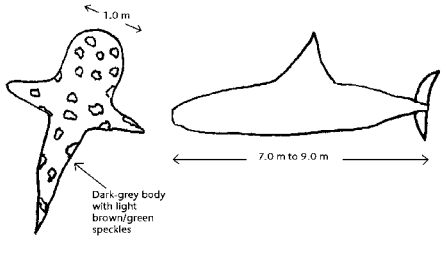
Binoculars were trained on the area whereupon some medium-size whales were observed jumping just clear of the water and landing on their sides. Three whales, all quite close to each other, were seen doing this a number of times over a three-minute period. As the vessel approached the area of activity the whales disappeared and, despite scanning the area for the next 15 minutes, they were not seen again.

When the whales jumped, the observers were able to get a good, albeit brief, look at them. It was estimated that they were between four and six metres long with small head and beak; small dorsal fin; stocky, grey upper body, and white belly which ran the whole body length.

m.v. *Maersk Asia Decimo*

- **12 July 2002**
- **Captain R.K. McGregor**
- **Persian Gulf**
- **Observers: Captain McGregor E. Porthouse (2nd Officer)**

The whales did not seem to be travelling anywhere when first seen, but simply jumped from the water. From the 'Eyewitness' handbook on board, their shape and size resembled one of the beaked whales — possible Blainville's beaked whale. They were certainly not bottlenose dolphins, which the observers were used to seeing, and seemed too small to be one of the rorquals.



Whale sharks: On passage from Doha to Jebel Ali, the vessel was in position 25° 40′ N, 53° 19′ E on a heading of 111°. The sky was clear, there were only light airs, and the sea was flat calm with no swell.

At around 0900 UTC three large dorsal fins were sighted off the starboard bow. Upon closer inspection of the area as the vessel drew nearer, several more distinct shark fins became visible on both the port and starboard bows. The total number observed was 11, all comprising one group. As the vessel drew still closer the sharks made no effort to move away, continuing to move around leisurely and with a seemingly effortless grace.

The closest one to the vessel was 20–25 m away. As indicated in the sketches, the sharks were quite large, about 7–9 m long by one metre wide, with large flattened heads. Half way down the length of the body was the prominent dorsal fin, whilst the tail was also very distinct, forming two vertical 'pronged fins'. All the whales were dark-grey in colour, with light brown/green speckles over the entire body.

The sightings were thought to be either whale sharks or large basking sharks, but there was no form of positive identification on board.

Editor's note 1. Dr Frank Evans, of the Dove Marine Laboratory, commented:

"The description and little sketch leave no doubt that this was a school of 11 whale sharks of a length between 7 m and 9 m. I welcome this report as I have no earlier ones of whale sharks in the Persian Gulf although there is a clutch of observations from the Red Sea and Gulf of Aden. Single schools of up to 20 animals have been reported and, on one occasion, five separate schools were sighted within a short time. These observations all date from the month of September and I have little doubt that these spectacular congregations are concerned with breeding around this time of year.

"It would seem from merchant ship reports that, while whale sharks are migratory and found world wide in tropical seas, mostly in coastal waters, the Persian Gulf may match the Red Sea as a breeding ground.

"Large assemblages of whale sharks are known from other places although I know of no reports from the Red Sea and the Persian Gulf other than from UK VOF ships. For instance whale sharks congregate in numbers off Belize. It is thought they arrive for fish spawning seasons to eat the eggs and fry and seem to be well informed about breeding timetables since they migrate considerable distances. Extrapolating from basking shark behaviour they are also there for copulation (male whales have an intromittant organ and fertilisation is internal). Basking sharks feed seasonally in shoals in rich areas, where at the same time they also show reproductive behaviour, breaching, pursuing, etc.

"The reproductive characteristics of whale sharks are poorly understood. Until recently it was believed that they laid eggs in football-sized horny cases, this from the doubtful discovery of a single 36-cm egg in the Gulf of Mexico in 1953 and repeated until quite recently. However, it now seems certain that they bring forth their young alive, and pregnant females have been found bearing scores of young, each as long as 60 cm. While ageing any shark is difficult (they have no bones, only cartilage) it is thought that whale sharks mature at 30 years.

"Our knowledge of the whale shark is woefully inadequate, so more reports — from anywhere in the world — please."

Editor's note 2. The *Maersk Asia Decimo* is recruited to the Hong Kong Voluntary Observing Fleet.

m.v. *Northwest Stormpetrel* ✉

- **21 July 2002**
- **Captain P. Lewis**
- **Banda Sea**
- **Observers: M. Deer (Chief Officer) Members of ship's company**

Bioluminescence: During the 4–8 watch (2000 UTC) the vessel entered an area of bioluminescence that covered the sea surface out to all points on the horizon. The glow from the luminescence was uniform all over, with black patches forming down the ship's sides owing to the bow wave. The intensity of the glow increased to approximately 2045 after which it started to dim and become patchy. At around 2100 the ship left the affected area, there being a distinct line apparent astern.

The ship was on passage from Dampier to Oita, and the following weather conditions were noted during the period of observation: air temperature 26°, wet bulb 23°, sea 26.8°, pressure 1013.0 mb, wind ExN'ly, force 2. There was no cloud or moonlight. The

ship's position was 05° 55.7′ S, 125° 30.7′ E, heading 006° at 17 knots.

Editor's note 1. Professor Peter J. Herring, of the Southampton Oceanography Centre, commented:

"This report is a typical account of the 'Milky Sea' phenomenon, in which steady bioluminescence stretches to the horizon. It is thought to be caused by a scum of luminous bacteria growing on a decaying bloom of phytoplankton. The Banda Sea is an area from which it has been frequently reported but it is most common in the north-west Indian Ocean in the July–September South-west Monsoon period (see *The Marine Observer*, 1993, 22–30, 'Milky Seas: a bioluminescent puzzle').

"Particularly interesting is that the black area visible down the hull reinforces the idea that the bioluminescence only occurs right at the surface and that the organisms responsible are not responsive to turbulent stimulation. In contrast, dinoflagellate luminescence usually involves the brightest light being seen in the turbulent water close to the hull."

m.v. *City of Cape Town*

Editor's note 2. The *Northwest Stormpetrel* is recruited to the Australian Voluntary Observing Fleet.

Seabirds: 1 August 2002. When the ship was on a coastal passage from Cape Town to Port Elizabeth, two seabirds were spotted gliding over the after-decks and around the accommodation. One of them then hovered 2 m over the port bridge wing before landing on a handrail where it was watched by Captain G.J.H. Peaston and Third Officer L.J. Nichol. It stayed for two minutes before resuming its glide around the ship, and a digital camera had found its way to the bridge by the time it returned to hover again about 30 minutes later. A picture taken by the Third Officer is on page 19.

m.v. *Maersk Ramsey*

Squall: 26 August 2002 between 0640 UTC and 0715 UTC. The ship experienced localised squall conditions within a thunderstorm when in position 51° 54.9′ N, 05° 55.1′ E. The pressure fell rapidly from 1015.8 mb to 1013 mb and there was heavy rain. Thunder and lightning had been present before the squall. During the squall the wind speed increased to 72 knots (ship's anemometer reading) which produced large amounts of driving spray and seas of two metres. The observers were Captain D.J. Podger, Fourth Officer B. Flood and Chief Officer A. Davidson.

m.v. *CSO Marianos*

- **7 September 2002**
- **Captain P. Whitley**
- **Hutton oil field (North Sea)**
- **Observers: J. Fidler (Chief Officer)**
  K. Devine (2nd Oficer)
  B. Dooley (2nd Officer)
  J. McCallion (IT)

Waterspout: At about 1730 UTC whilst the vessel was engaged in diving operations in the North Sea in position 61° 04′ N, 01° 24′ E. The stern was facing in a northerly direction from whence the prevailing winds also came.

Bearing down upon the vessel were large cumulus clouds stretching across the horizon. Rain could be seen falling from the base of the cloud and, over a small extent of the base were what looked like ragged stratus clouds, very dark in colour and ever changing in shape.

m.v. *Pacific Teal*

Lightning was then observed, however it did not last for any great length of time. The usual increase in wind did not materialise — rather, as the cloud passed, the air became quite still. Then, about 4 miles south-east of the vessel, the base of a large cumulus cloud could distinctly be seen extending down towards the surface of the water. It formed a funnel shape which petered out at the base of the ragged cumulus. Spray could be seen from the disturbed surface of the water. The phenomenon lasted for approximately four minutes before dissipating.

m.v. *Altrans*

- **14 September 2002**
- **Captain T. Drever**
- **Tasman Sea**
- **Observers: Captain Drever**
  C. Ostler (2nd Officer)

Turtles: 10 September 2002. Chief Officer T.T. Lunt and others on board the ship sighted numerous turtles during a period of two or three hours around 1400 UTC. In the largest group were 10–15 turtles, varying in size from 'dinner plate' to 'dustbin lid', and all of a rusty-brown colour. Approximately two miles away on the port beam, the *Pacific Pintail* also reported sightings. The next day only single turtles, or an occasional pair, were seen. The ship's position when the turtles were first seen was 35° 14′ N, 20° 49′ W.

Fish and sharks: At about 0230 UTC in position 35° 35′ S, 158° 30′ E, the observers considered themselves privileged to see not one, but five sun fish, and three basking sharks over a period of about 30 minutes. During this time the ship covered five miles (on passage from Gladstone to Bluff), with the sunfish and sharks being evenly distributed in the area. They all appeared to be adults owing to their size, with no juveniles evident.

The sunfish were a distinctive white colour on their lower halves, their general appearance being that of an enormous blow fish. They appeared to be lying at an awkward angle, just underneath the surface. Two fins extended from each side of the fish, moving in a similar fashion to that of a manta or sting ray.

The basking sharks had a large, dark-coloured dorsal fin which protruded from the water while the rest of the bulbous body lay just under the surface. Their only movement was to 'flop' from side to side in the swell. It was not felt conclusive that these were basking sharks, but the observers' description matched the accounts of other personnel who had encountered them. At the time of the sightings, the vessel was in calm conditions caused by a large high-pressure area.

Editor's note 1. Dr Frank Evans, of the Dove Marine Laboratory was very pleased to receive this report, commenting:

"Thank you for this report of five sunfish and three basking sharks seen together. I am not sure why there should be a congregation of so many large fish at one spot, but both species eat small, slow-moving prey and it may have been an area of upwelling with particularly rich pickings. I have written recently about sunfish (*The Marine Observer*, July 2002, 114).

"As to the basking sharks, although they are reported and indeed hunted fairly commonly, reports of them from Selected Ships in the southern hemisphere are rare indeed. Basking sharks are found off the coasts of western North America from Baja to southern Alaska, off the east coast of the US and southern Canada, along the Gulf Stream, to the entire coastline of Europe, off the southern coast of Australia (as here), off South Africa, New Zealand, most of southern

m.v. *City of Cape Town*

- **18 September 2002**
- **Captain J.C. Harris**
- **Indian Ocean**
- **Observer: L.J. Nichol (3rd Officer)**

South America and the coastlines of China and Japan. They have been reported from the Red Sea also but I suspect that there they have been confused with whale sharks.

"The lazy loafing with relaxed dorsal fin as described appears to be characteristic of this species. We even have a report of one lying happily at the surface in a force nine gale. This species may be threatened and reports are therefore especially valued."

Editor's note 2. The *Altrans* is recruited to the Australian Voluntary Observing Fleet.

Editor's note 3. See pages 15 and 21 of this edition for more about whale sharks and basking sharks.

Whales and dolphins: At about 0900 UTC whilst the ship was on a coastal passage from Port Elizabeth to Durban, the observer's attention was caught by a very small whale (or possibly a dolphin) jumping almost clear of the water and splashing back down again. This particular animal did not return, so a more positive identification was not possible.

m.v. *Taiko*

- **1 October 2002**
- **[Captain not stated]**
- **South Pacific Ocean**
- **Observers: J.P. Briand (Chief Officer) I.R.C. Pypen**

Following this, and over a period of about three minutes, at least two large humpback whales, each estimated to be approximately 10 m in length were seen. They were spotted on the port bow 'playing' at a range of roughly three cables, repeatedly surfacing before starting a shallow dive and then resurfacing again. The distinctive 'hump' coupled with the small notched dorsal fin, left the observer in no doubt as to the identity of the whales. The large tail fins were raised well clear of the water and were clearly visible on several occasions. Several observations similar to this were made subsequently throughout the morning at varied bearings and ranges from the vessel.

Space debris: Whilst keeping the evening watch 4–8 watch, and approximately one hour after sunset, the sea and sky were suddenly lit a bright iridescent green which was sufficiently intense to show the ship's deck and fittings in clear detail.

On looking up, the observers watched the progress of a meteorite or space debris travel from right above them to a point about 15° above the horizon — directly east to west. The duration of travel was a good three seconds and was an amazing spectacle to observe. The object gave the appearance of breaking up into several pieces in line as it progressed to the western horizon. There appeared to be at least five distinct pieces in the final moments before it disintegrated and vanished from sight in a shower of bronze-coloured debris.

Of particular note was the brilliance of each individual section which showed as bright silver-green with traces of bronze/orange around the outside. Both observers had been at sea in excess of 40 years, but neither had ever witnessed such an intensity of light. At the time of the event the ship was east of Gisborne in position 38° 38′ S, 178° 30′ E.

Whale-sized sharks are no 'fishermen's tales' *

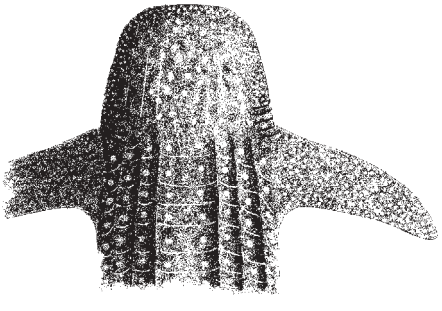
The shark family comprises around 900 species, which also includes rays and dogfish. It is perhaps surprising, therefore, that sharks are not reported more often by ships' observers. However, sharks and their allies have adapted to conditions at all depths; thus, observers may see only those that habitually live near the surface.

Sharks rarely breach, making them hard to spot. Since the most visible part of a shark at the surface is its first dorsal fin (and perhaps the tip of the tail), it can be easily missed in anything other than calm sea conditions. Of the reports that are received from ships, the greater proportion have been made in such conditions, where the entire body has been seen below the surface. Hammerheads are perhaps the easiest to identify owing to their unique shape, but there are two more — in fact the world's largest fish species — which observers should find easily identifiable if encountered. These are the whale shark and the basking shark, reports of which appear on pages 10 and 13 of this edition.

Which is which?

It might be assumed by observers that all very large sharks seen at or near the surface are basking sharks, and they might well be right if in cool temperate or higher latitudes at the time. However, in coastal and ocean tropical waters (and perhaps in the Red Sea and the Persian Gulf), the whale shark would be more likely. So, how do they differ?

Whale shark: This the true giant of the fish world. Its food largely comprises plankton although fish and squid may well be included in the diet. It does not need to swim in order to draw water through its filter screens, but can simply hang in the water and 'suction feed' by opening its mouth and allowing water to rush in (the mouth is transversely positioned, and is up to 1.5 metres wide). The shark seems to favour areas around cold upwellings where, presumably, optimum conditions exist for its prey.

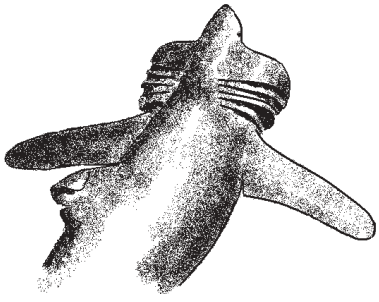


Apart from sheer size, it is notable for its obviously broad and flattened head. The body is white below, and blue-grey above with complex patterns of white bars and spots. The pattern immediately behind the last of the five gill slits is unique to each shark, and allows photo-identification of individuals. (The diagram — not to scale — shows the approximate appearance of a whale shark when seen from above.)

Normally solitary, the whale shark can stay submerged for weeks at a time but is found mostly at the surface; however, large aggregations numbering hundreds of sharks have also been recorded. Their gigantic size could lead to exaggerated estimates of length, but this shark reaches 15–18 metres and weighs in at 20 tons! Very little is known of its natural history, although it appears that the Red Sea and perhaps the Persian Gulf are important sites for breeding. Whale sharks give birth to live young.

* See also 'Playing 'tag' with giant sharks' on page 21 of this edition

Basking shark: Measuring up to nine or 10 metres and weighing in excess of six tons, this is the second-largest of the world's fish, and is almost wholly dark-grey or black with perhaps a white or grey band along the underside. Taking its name from its habit of swimming in sluggish fashion at the surface, as if basking in the sun, it is also known as 'sunfish' in some areas (although no relation to the slightly comical ocean sunfish). Living on tiny marine organisms found at the surface, it filters these from water passing from mouth to gill slit, using stiff dark bristles that line the throat and gill arch. When fully extended, the gill slits almost encircle the entire body, as indicated in the diagram (not to scale). To acquire food the shark simply swims slowly around with its cavernous mouth wide open. During feeding, the tip of its pointed nose is pushed upwards and, if this occurs very near the surface, the nose may break the surface along with the first dorsal and caudal fin. From a distance this offers the illusion of three fins and hence a possible overestimate of length. (Note to observers: When estimating length in basking sharks, the distance from first dorsal to tip of the caudal fin is approximately two-thirds of the total body length.)



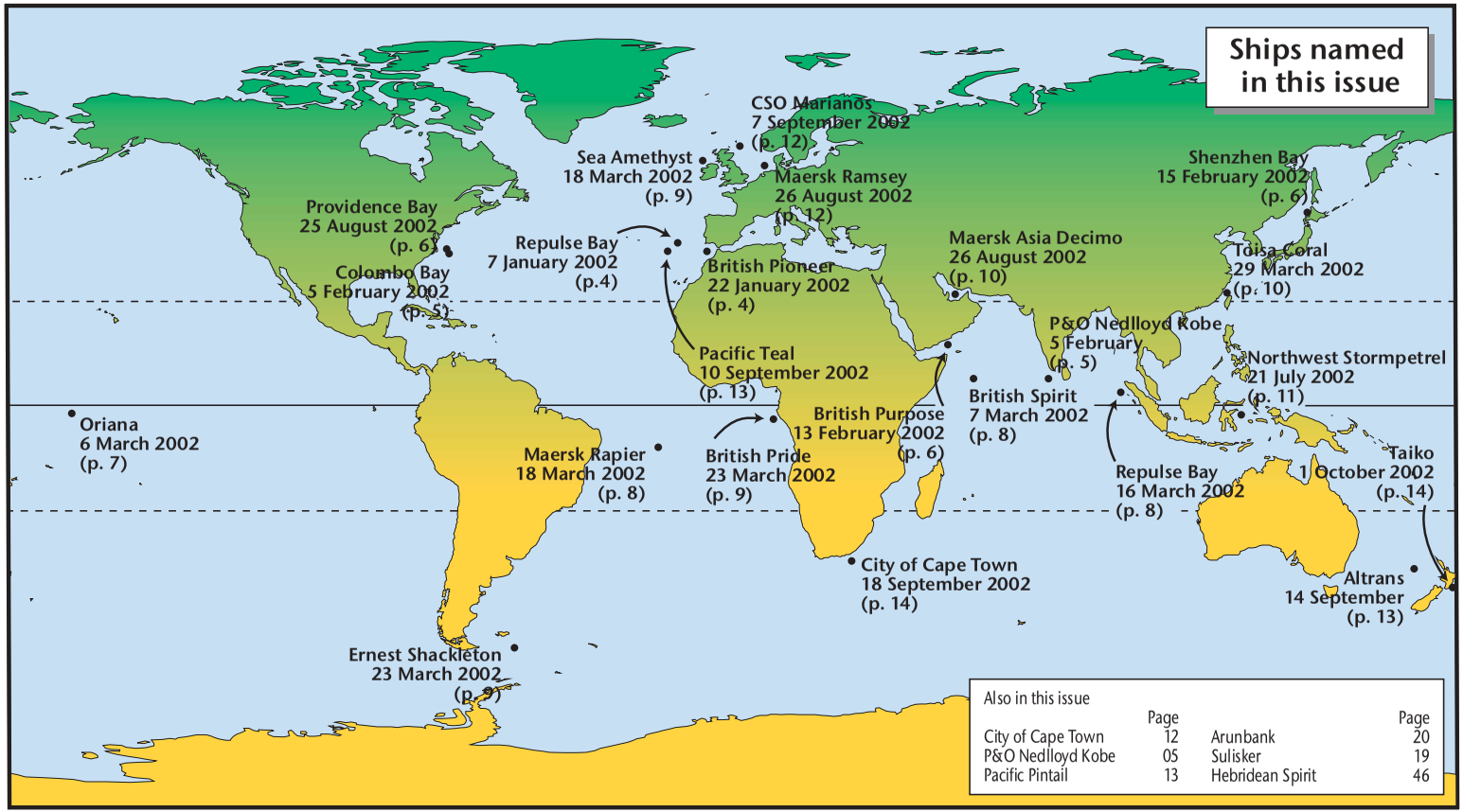
Unsolved mysteries of basking sharks and whale sharks

Little is known about the habits and movements of either of these sharks. For example, in the spring of 1998, approximately 500 basking sharks congregated off the Cornish peninsula (UK), apparently attracted by plankton 'blooms', but where they had come from was not known since the species is normally oceanic. Northern populations of the species are also thought to lie dormant somewhere at the seabed in deep water during the winter months when their food supplies dwindle and their gill rakers fall off. Those in warmer southern waters, however, may well be active all year round.

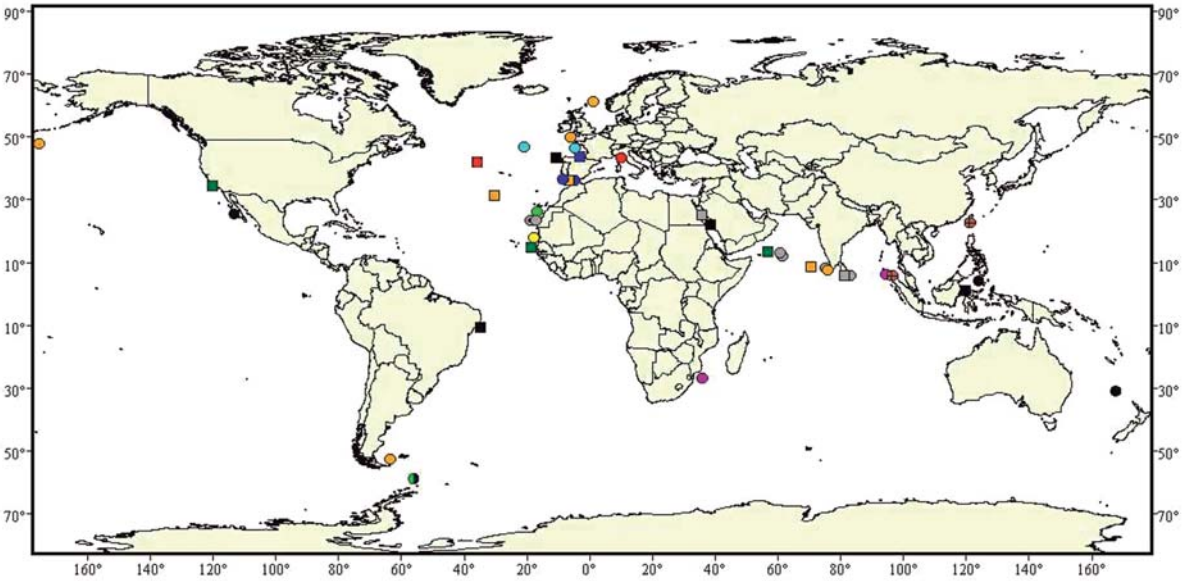
Whale sharks, although found in coastal and oceanic regions of the tropics, are not common. Understanding where they go and what they do presents a major challenge. Ship reports, as featured on page 10 of this edition, clearly illustrate that there are favoured gathering areas, possibly for breeding purposes, but again shark movements leading up to this are not clearly understood.

Man's effect on the two species is also unknown, and their status has yet to be accurately assessed. For example, the effects of basking shark fisheries are not understood. In the past these sharks have been extensively fished for liver-oil products, flesh, cartilage and skin. Fishery operations around the Western Isles of Scotland and off western Ireland (now ceased) accounted for about 1,000 sharks annually in their best years, with little regard to the recovery of stocks. Although hunting or harassing basking sharks within the UK 12-mile national limit is now illegal, it is hunted in other seas. Only the fins are taken from a netted or harpooned shark, the unfortunate creature then being discarded to face a slow death. Until its natural history is better understood, there is little idea of how the species is coping with humans.

The lethargic habits of the whale shark also leave it vulnerable to human activities — its surface existence can lead to ship strikes, and fisheries exist (or have existed) for it in waters surrounding the Philippines, Indonesia, Taiwan and India. It is thought that both species follow currents to find food. If so, studies might show that they can act as indicators for changes occurring in the oceans.


Ships named in this issue
CSO Marianos
7 September 2002
(p. 12)
Sea Amethyst
18 March 2002
(p. 9)
Maersk Ramsey
26 August 2002
(p. 12)
Shenzhen Bay
15 February 2002
(p. 6)
Providence Bay
25 August 2002
(p. 6)
Repulse Bay
7 January 2002
(p.4)
British Pioneer
22 January 2002
(p. 4)
Maersk Asia Decimo
26 August 2002
(p. 10)
Taisa Coral
29 March 2002
(p. 10)
Colombo Bay
5 February 2002
(p. 5)
P&O Nedlloyd Kobe
5 February
(p. 5)
Pacific Teal
10 September 2002
(p. 13)
Northwest Stormpetrel
21 July 2002
(p. 11)
British Spirit
7 March 2002
(p. 8)
Oriana
6 March 2002
(p. 7)
British Purpose
13 February 2002
(p. 6)
Maersk Rapier
18 March 2002
(p. 8)
British Pride
23 March 2002
(p. 9)
Repulse Bay
16 March 2002
(p. 8)
Taiko
1 October 2002
(p. 14)
City of Cape Town
18 September 2002
(p. 14)
Altrans
14 September
(p. 13)
Ernest Shackleton
23 March 2002
(p. 9)
Also in this issue
Page
City of Cape Town 12
P&O Nedlloyd Kobe 05
Pacific Pintail 13
Page
Arunbank 20
Sulisker 19
Hebridean Spirit 46

Summary of cetacean sightings made by observers on UK Voluntary Observing Ships. October 2001—October 2002



K. MacLeod

The symbols represent reports for which Dr Kelly MacLeod (Gatty Marine Observatory, University of St Andrews), was able to identify the species observed.

KEY:

Scene at sea

P. Laycock

Left: *A pipit pictured on board f.p.v.* Sulisker *on 9 April 2002. This was one of several found on board when the vessel was 40 miles north-north-west of Muckle Flugga.*

Editor's note. Commander M.B. Casement, OBE, of the Royal Naval Birdwatching Society (RNBWS), believed the bird to be a meadow pipit. This species and the rock pipit are both possible in that area, on spring and autumn migration. However, the meadow pipit is much more common, while rock pipits are more sedentary. Rock Pipits are slightly larger, darker, with less prominent throat markings and darker leg colour, but these features are not distinguishable in this picture.

L.J. Nichol

Left*: Antarctic skua gliding at bridge-wing height next to the* City of Cape Town *on 1 August 2002. (See page 12.)*

I.C. Oke

Left: *A stormpetrel photographed on 4 December 2002 in position 32° 00′ N, 39° 42′ W by Mr I.C. Oke (currently working on a non-observing ship).*

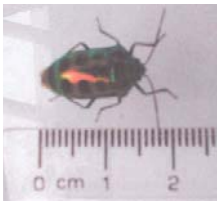
Commander Casement and his colleagues confirmed the identity of the bird as a Madeiran stormpetrel. A species with which this can be confused is Leach's stormpetrel — both occur in the mid-eastern North Atlantic at that time of year, but the depth of the forked tail, and the shape of the white rump indicate the Madeiran stormpetrel.

Dazzling insects visit the *Arunbank*

The *Arunbank* frequently works routes between Vanuatu and Papua New Guinea, the many islands encountered providing an array of wildlife that might not be seen on ships working deep-ocean passages. Third Officer J.M. Simpson, Cadet J. Cox and passenger E. Greenhill, found the insects shown below on 6 February 2002 when the ship was on a heading of 350° on the east coast of Espíritu Santo, sailing for Lae (Papua New Guinea).

Discovered on the port bridge wing, they varied from dull-brown beetles the size of ants, to brilliantly-coloured 'rotund beetles' 15 mm long by 8 mm wide (shown in (a) and (b) below). Also found was one large beetle, 5 cm long by 2 cm wide, brown in colour with large eyes and big, pincer-like jaws (shown on a pencil in (c) below). Later in the passage, other insects including the moth shown in (d) were sighted.

(a)



(b)

Anon

(c)

(d)

Weather conditions on 6 February were: air temperature 30°, wet-bulb 27.3°, wind NxW'ly, force 2; the sky during the period was completely covered by cirrus accompanied by cumulus and stratocumulus at different levels. At the time of the first sightings, the ship's position was 15° 11′ S, 167° 16.3′ E.

Editor's note. Dr Andrew Whittington, of the National Museums for Scotland, identified the insects as follows:

"Small round beetles (a) and (b) — Hemiptera: Heteroptera; Scutelleridae, *Chrysocoris*. These beautifully coloured 'metallic' bugs are not beetles at all. True bugs such as these have sucking mouth-parts, which they use for sucking plant juices.

"Large beetle (c) — Coleoptera: Cerambycidae, Prioninae. These long-horn beetles tend to breed in rotten moist wood. Adults have a heavy clumsy flight and may be attracted to lights.

"Large moth (d) — Lepidoptera: Sphingidae, *Gnathothlibus erotus* (Craemer, 1779). This distinctly marked moth is probably a form of *Gnathothlibus erotus* or a species near to this. Sphingidae are hawk moths, these are strong fliers often attracted to flowers from which they can feed on the wing by hovering in front of the bloom and extending a long tongue-like proboscis. Many hawk moths are larger than (and may be mistaken for) hummingbirds. The larva (or caterpillar) feeds on a variety of plants including grapes, sweet potato, virginia creeper, pavetta and guinea flower."

Playing ‘tag’ with giant sharks

In order to learn more about basking sharks and whale sharks special observation programmes have been set up, some of which are described here.

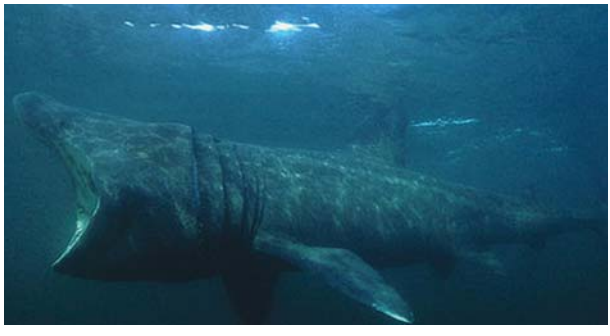
Three-year research project on basking sharks in UK waters

In the UK, a joint three-year project was launched in February 2001 by CEFAS*, DEFRA†, and the Marine Biological Association. The aim is to provide scientific information concerning the movements, population and distribution of basking sharks in European waters. A total of 10 sharks were tagged in each of the first two years — the tagging locations being off Plymouth, and off Tarbert in the Firth of Clyde.

Data are collected using a satellite-based tagging system whereby the tags (programmed to transmit at intervals of three, six, nine or 12 months) relay time-related data about water depth, ambient light levels and water temperature. Information gained in this way will be combined with visual sightings of live or stranded sharks to give a more complete picture of the natural history of the species.

European Basking Shark Photo Identification Programme (EBSPIP)

Photo-identification makes use of the unique colour, patterns, pigments or scarring characteristics as an aid to identifying individual sharks — a similar technique is also used to identify cetaceans. The area most likely to show visible features is around the dorsal fin, although the caudal fin is also a possibility.



EBSPIP

***Above**. A basking shark in feeding posture. The raised snout may sometimes protude above the waterline.*

EBSPIP is creating a photographic library intended primarily for research purposes, but available to the public via the programme’s web site, and aims to gather as many records as possible.

Anyone who is well located to take clear photographs of basking sharks is welcome to contribute to the gallery of images. Views of the first dorsal fin, both from the side and ‘head on’, together with details of date, time and position are requested. Full details of the project can be found at : www.baskingsharks.co.uk

Whale shark tagging by Australian interests

In the southern hemisphere Australia began a satellite-tracking programme involving whale sharks in 1999. Ningaloo Reef, on the north-west coast of Western Australia is a marine park covering 250 km of coastline, and extends out to 15 miles offshore. For some time the park has been known by local fishermen as a site for whale shark aggregations.

---

*CEFAS. Centre for the Environment, Fisheries and Aquaculture Science.

†DEFRA. Department for the Environment, Farming and Rural Affairs

(See also page 15 of this edition)

One result of this has been a surge in 'ecotourism' built around the sharks. They have become a great attraction for recreational and professional divers, and are also the subject of documentaries. In response to concerns that the sharks could be vulnerable to fishery activities to the north of Australia, and in order to learn more about the annual visitors to Ningaloo Reef, scientists from the Australian CSIRO* and the Australian Institute of Marine Science co-organised a joint project to satellite-tag sharks there in 2002. The intention is to track their movements for 12 months.

On 22 April a female whale shark measuring seven metres was tagged off Cloates, Western Australia. During the weeks that followed, the shark (named 'Hope Traveller' by Year 3 school students in Exmouth, Western Australia) travelled 3,130 km up to 16 July. At this point the transmissions ceased and, to date, the fate of the tag and Hope Traveller is not known. Nevertheless, this was already more successful than taggings made in earlier years when the sharks involved covered much shorter distances before their tags were shed.

***Above:** 'Mandu' a 7.3-metre male whale shark.*
(Note the accompanying human divers at the surface.)

Another shark, a male named 'Mandu' (shown above) was fitted with a tag on 28 June. He headed towards the north-east and Indonesian waters, covering 1,740 km to 31 July when the tag's transmissions ceased. At this point the shark was within 100 km of Indonesia. The tracks of both sharks are shown in Figures 1 (a) and 1(b). These taggings have provided valuable short-term information, but data about long-term migrations is still proving elusive. However, tagging programmes organised by US interests have shown that sharks tagged off southern California covered 13,000 km in 37 months. So Hope Traveller and Mandu could even now be way out in the Indian or Pacific Oceans, or making leisurely progress towards their next annual aggregation at Ningaloo Reef Marine Park.

* CSIRO. Commonwealth Scientific and Industrial Research Organisation

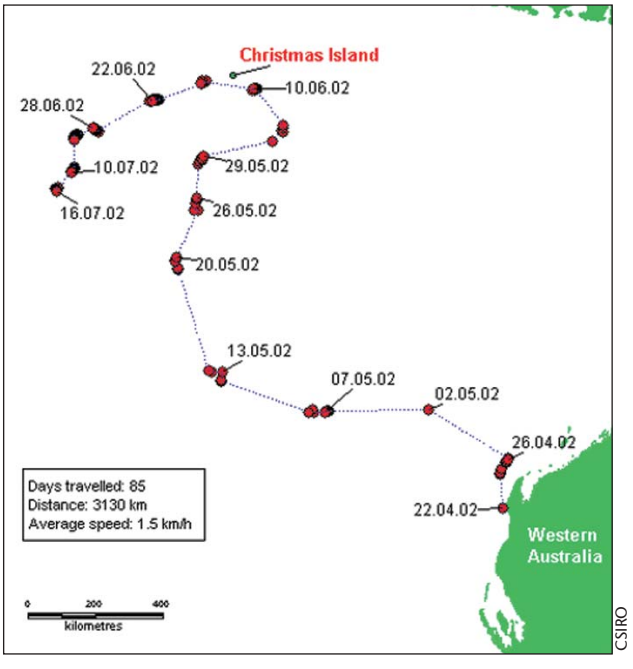


Figure 1(a): *The path taken by the female whale shark 'Hope Traveller' between April and July 2002.*

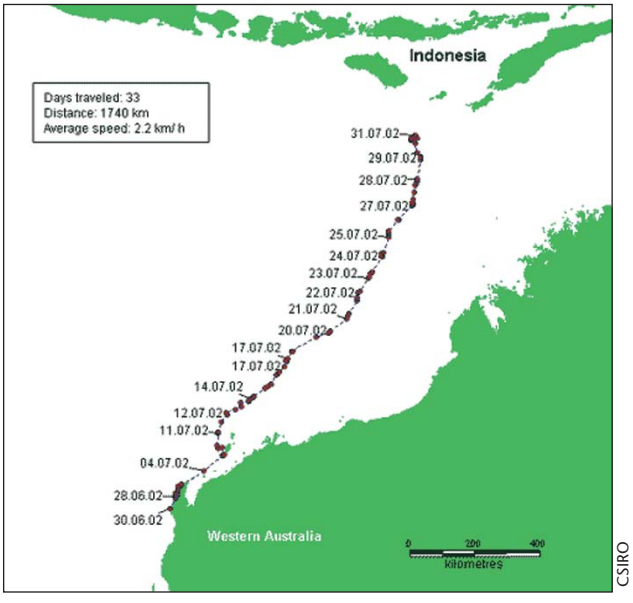


Figure 1(b): *The path taken by the male shark 'Mandu' during July 2002. When last heard from, the shark was about 100 km from Indonesia.*

Further information

Australia also operates tagging programmes for other sharks occurring in national waters. Specimens of the endangered grey nurse shark, and the great white shark have both been tracked successfully, the first giving details of its activities along the coasts of New South Wales and southern Queensland, while the latter has been followed along the coast of Victoria and across Bass Strait. Details of these programmes can also be found through the CSIRO web site.

The UK Marine Conservation Society (MCS) has operated the 'Basking Shark Watch' since 1987 and gathers information about the sharks that visit UK waters during the summer months. Reports of basking sharks in home waters can be made through the MCS web site, but the report form can also be downloaded and printed if required.

Acknowledgement

The help of Craig Macauley, of CSIRO, in the preparation of this article is greatly appreciated.

References

Australian Commonwealth Scientific and Industrial Research Organisation:

www.marine.csiro.au/LeafletsFolder/51wshark/51.html

www.marine.csiro.au/research/tagging/hopetraveller/index.html

www.marine.csiro.au/research/tagging/mandu/index.html

Wheeler, A. 1979.The World Encyclopedia of Fishes. Macdonald & Co. (Publishers) Ltd, London

Waller, G. (Ed.). 1996. Sealife. A complete guide to the marine environment. Pica Press, Mountfield.

Centre for the Environment, Fisheries and Aquaculate Science.
www.cefas.co.uk/sharks/default.htm

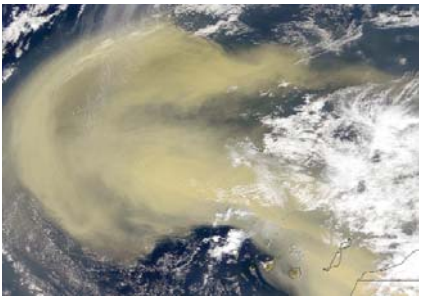
European Basking Shark Photo Identification Programme. www.baskingsharks.co.uk

Marine Conservation Society. www.mcsuk.org/

A dirty planet is a happy planet *

A. Ridgwell

Dust, something of a nuisance in your home perhaps, but it may be vital to the health of the planet. The wind can pick up anything smaller than the width of a human hair that isn't firmly glued down and carry it great distances through the atmosphere. This dust is mostly fragments of rock minerals and other soil constituents, but can include anything of suitable size, such as pollen grains. Billions of tons of dust are blown away each year, particularly from arid regions (with dry soils and sparse ground cover) where incredible clouds of dust can be clearly seen from space.



Norman Kuring

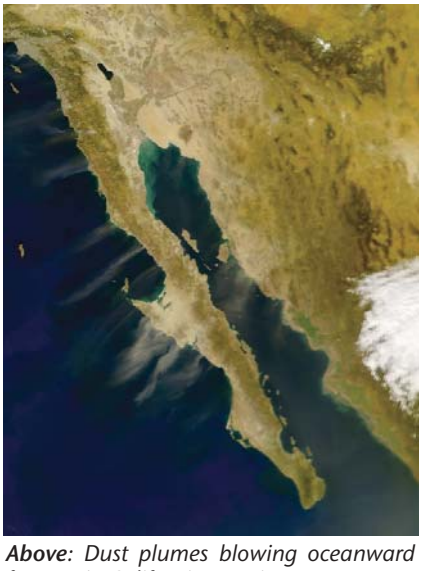
Above: *Dust storm blowing off North Africa across the Canary Islands.*

Suspended in the air, dust affects the optical properties of the atmosphere. The red sun and sky of a beautiful sunset are caused by dust scattering away the blue light from the sun's rays, allowing red light to predominate. Climate modellers have found that dust can actually affect the temperature at the Earth's surface by modifying incoming sunlight and outgoing infrared light.

Where does all this dust go? Although the wind can carry smaller particles half way around the Earth, sooner or later they might hit (and maybe stick to) a solid surface or be washed out of the sky by falling raindrops.

Manna from heaven

The chemical composition of a dust particle reflects the soil it came from, and soil contains nutrients. This means plant nutrients are falling out of the sky. Manna from heaven! Nutrients such as phosphate falling from the atmosphere can be critical in maintaining the health and productivity of ecosystems with poor, infertile soils. Recent research suggests that dust carried across the Atlantic from the Sahara and Sahel deserts feeds the soil in parts of Amazonia, and that dust from the central Asian deserts feeds the Hawaiian Islands' soil.



SeaWiFs Project

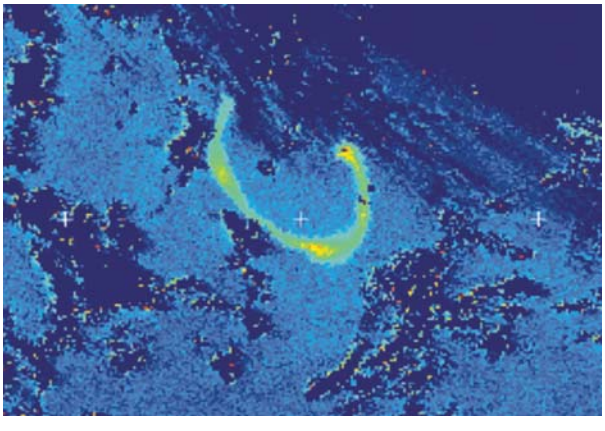
Above: *Dust plumes blowing oceanward from Baja California, Mexico*

* Reprinted from *Planet Earth*, Summer 2002 (Natural Environment Research Council) with permission of the Editor, and author.

Ironing the oceans

My own particular interest, however, is in what happens when dust falls onto the oceans. Dust contains iron, an essential nutrient for microscopic marine plants (phytoplankton) — the grass of the ocean. Phytoplankton use carbon dioxide from the atmosphere and, when they die, they sink to the bottom of the ocean, taking with them the carbon dioxide they have used to make their bodies. In places, it appears that there is not enough iron for the phytoplankton.

Several international collaborative experiments, including NERC-funded scientists from the University of East Anglia, 'fertilised' parts of the Equatorial Pacific and Southern Ocean with iron to find out how an extra supply of iron would affect phytoplankton. Indeed it often stimulated so striking an increase in phytoplankton numbers that the ocean visibly changed colour! All this suggests that any change in dust supply alters marine productivity, and with it, the removal of carbon dioxide from the atmosphere. This has powerful implications for how the Earth's climate system may operate.



Above: *Phytoplankton bloom stimulated by iron fertilisation, remotely sensed by satellite, some six weeks after initial iron release.*
*(SeaWiFS data, provided by the NASA DAAC/GSFC and copyright of Orbital Imaging Corps and the NASA SeaWiFS project, was processed at CCMS-PML.)**

About 15,000 years ago, the huge ice sheets which had covered much of the northern hemisphere for 70,000 years, rapidly retreated, leaving the UK with the mild wet climate that we enjoy (!) today. One compelling theory as to why this happened is that increased carbon dioxide in the atmosphere warmed the Earth and triggered the collapse of the ice sheets. What drove carbon dioxide levels up? Ice cores drilled deep in the Antarctic ice cap show a decline in dust immediately before the rise in carbon dioxide, suggesting that a reduced iron supply (to the Southern Ocean) may have been important. Results from my computer model of the ocean carbon cycle support this hypothesis. It is amazing to think that rock fragments, too small to see with the naked eye, may have helped bring about the end of a global deep freeze.

---

* *Editor's notes*. SeaWifs—NASA's Sea-viewing Wide Field-of-View Sensors, carried by satellite

Robbing Peter to pay Paul

What about future climate? The supply of wind-blown iron to the ocean depends on a suitable source of dust. How much dust there is, depends on how the land is used — is the soil ploughed, is it left bare in winter? The Kyoto Protocol encourages countries to remove (sequester) carbon dioxide from the atmosphere and store it in vegetation and soils. Many ways of achieving this, such as changing agricultural practices and planting new forests, will help protect the soil from wind erosion and restrict the supply of dust to the ocean. With the aid of my computer model, I calculated that even a small decrease in iron supply reduces the ocean's ability to 'soak up' fossil fuel carbon dioxide emitted to the atmosphere. To me, terrestrial carbon sequestration might be 'robbing Peter to pay Paul' — by deliberately engineering more carbon dioxide uptake on land, we might damage the ocean carbon sink.

By following the cycle of dust from start to finish, we are finding that dust closely links together many parts of the Earth System; coupling the land surface and ecosystems of widely separated continents, linking the fate of ancient ice sheets with microscopic marine plants, and producing an adverse reaction in the ocean to improved farming practices on the land. Understanding a complex and interlinked system such as the Earth's climate requires a truly interdisciplinary approach. The joined-up thinking known as Earth System science is the only way that we can hope to discover all the consequences of human intervention in the climate system, and before they become too much of a...surprise.

About the author

Dr Andy Ridgwell is Postdoctoral Researcher at the Department of Earth Sciences, University of California-Riverside, and a visiting Fellow at the University of East Anglia.

A paper describing the possible dust-driven 'side effect' of carbon sequestration on land appears in a recent issue (Vol. 29, Part 6) of *Geophysical Research Letters*. 10.1029/2001GL014304, 2002.

Further information on the role of dust in the Earth System can be found at:

http://tracer.env.uea.ac.uk/e114/publications.html

A library of 'SeaWiFs' satellite images can be found at:
http://seawifs.gsfc.nasa.gov/SEAWIFS/IMAGES/IMAGES.html

El Niño — causes, consequences and solutions*

C. Coghlan

Over the last 30 years, the El Niño phenomenon has received substantial attention throughout the world, primarily because of its severe global impacts. The event is now portrayed regularly worldwide in newspapers, magazines, and on television news and other programmes, and it is thus becoming increasingly familiar to the general public.

Scientists have been baffled by the phenomenon for many decades. Research attempts have uncovered many aspects of the events such as the physical characteristics, and its dynamic effects which are felt all over the globe. The El Niño occurrence is now seen as one of the most prominent sources of interannual variations in weather and climate around the world (Glantz *et al*. 1991). The development of our understanding has led to the term 'El Niño' being directly related to, and a consequence of, the coupling of the tropical atmosphere and ocean. It is only in the last few decades that there has been a greater focus on the warm and cold phases of the phenomenon — El Niño and La Niña, respectively.

What is El Niño?

El Niño translates as 'the Christ child'. Studies show that El Niño was first brought to notice over 100 years ago. However, documentary evidence from local South American mariners and fishermen indicates that the El Niño phenomenon dates back to at least the early 1500s. South American west coast fishermen used the term 'El Niño' to define the annual weak warm current that ran southwards along the coast of Peru and Ecuador around Christmas time (Glantz *et al*. 1991).

During the latter years of the nineteenth century, further scientific exposure of El Niño developed, and studies in the first half of the twentieth century showed strong links of local flooding rains in Peru with warm episodes. Schott was the first to use the term 'El Niño' for the wider oceanic occurrence of warm waters advected southward from around the Galapagos Islands and, during 1957/58, for the first time, observations were made of large-scale oceanic warming extending across the equatorial Pacific beyond the dateline in connection with an El Niño event during that period (Allan *et al*. 1996).

The term 'La Niña' became more renowned in the latter decade or two of the twentieth century. Translating as 'the girl child', the term is known today for the opposite oceanic conditions to El Niño.

Normal conditions

Throughout the year the Pacific Ocean surface is warmest in the west and coldest in the east. The greatest range in temperature occurs during September and October when temperatures in the western Pacific reach their annual maximum. Temperatures across the central Pacific then normally start to increase during December and peak in April as the intensity of the upwelling decreases.

---

* Reproduced from *Weather*, a monthly magazine published by the Royal Meteorological Society, with permission of the Editor and author. This article was the winning entry in *Weather's* essay competition for 2001.

The Royal Meteorological Society's internet address is: www.royal-met-soc.org.uk

Ocean surface temperatures across the tropical Pacific contribute significantly to the observed patterns of tropical rainfall and tropical thunderstorm activity. As Figure 1 shows, the heaviest rainfall is typically observed across Indonesia and western parts of the tropical Pacific, with least rainfall occurring across the eastern equatorial Pacific. The mean patterns of sea surface temperature and equatorial rainfall are accompanied by low-level easterly winds and upper-level westerly winds across the tropical Pacific. Figure 1 illustrates how, over the western tropical Pacific and Indonesia, this wind pattern is associated with low air pressure and ascending motion, while over the eastern Pacific it is accompanied by high pressure and descending motion. Collectively, these conditions reflect the equatorial Walker circulation which is a primary large-scale circulation feature across the Pacific.

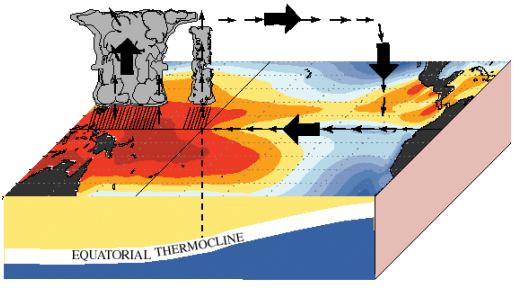


***Figure 1**: December — February normal conditions (from the National Oceanic and Atmospheric Administration (NOAA)*

The subsurface ocean structure is characterised by a deep layer of warm water in the western tropical Pacific, and by a comparatively shallow layer of warm water in the eastern Pacific, as Figure 1 shows. This warm water is separated from the cold, deep waters by the oceanic thermocline, which is normally deepest in the west and slopes upward toward the surface further east. The resulting east–west variations in mean upper-ocean temperatures, and hence densities, result in east–west variations in sea-level height, which is higher in the west than in the east. Figure 2 shows this pattern for the winter of 1995/96 (normal conditions). Data are taken from the joint NOAA/Centre National d'Etudes Spatiales satellite altimeter, Topex-Poseidon. * Sea-level deviations were calculated with respect to the 3-year period 1993–96.

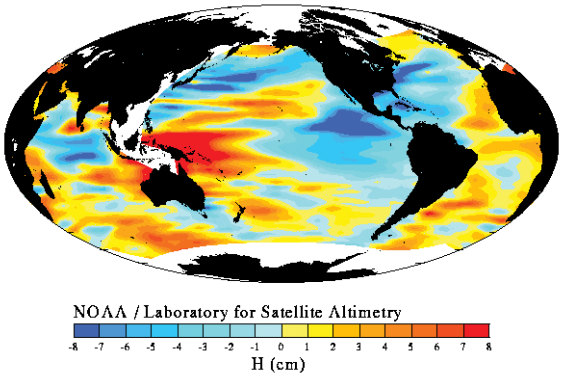


***Figure 2:** Topex-Poseidon sea-level deviation, with respect to the period 1993-96, for winter 1995/96*

Pacific Ocean temperatures, tropical rainfall and vertical motion patterns greatly affect the distribution of atmospheric heating across the tropical and subtropical Pacific. Normally, the strongest heating and highest air temperatures coincide with the warmest ocean waters and heaviest rainfall. This atmospheric heating helps to determine the overall north–south temperature differences in both hemispheres, which significantly affect the strength and location of the jet streams.

---

* *Editor's note.* The ocean Topography Experiment (TOPEX-Poseidon) is a joint French/US project. It is an advanced satellite system observing the oceans with unprecedented accuracy.

These tend to be most pronounced during the respective hemisphere's winter season, when both the location and eastward extent of the jets exhibit a strong relationship to the pattern of tropical heating. These jet streams are then a major factor in controlling the winter weather patterns and storm tracks in the middle latitudes over both North and South America. La Niña conditions are essentially extreme forms of 'normal' conditions.

El Niño conditions

Defining what is an El Niño event is not straightforward, as each has its own characteristics and strength while exhibiting the general properties of El Niño. During an El Niño event, the low-level trade winds relax in the central and western Pacific, leading to a depression of the thermocline in the eastern Pacific and an elevation of the thermocline in the west. The result is a rise in sea surface temperatures as upwelling decreases (NOAA 1998).

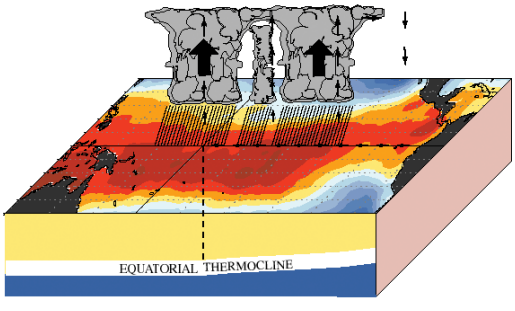


Figure3: *December-February El Niño conditions (from NOAA)*

Figure 3 shows that during the phase associated with El Niño, anomalous cloudiness and convection are created by the band of warm water that develops in the central Pacific. Atmospheric pressure falls in the eastern Pacific, whilst above normal atmospheric pressure is evident in the Australasian region. Rainfall accompanies the warm water eastward, and tropical cyclone tracks and genesis regions tend to be displaced to the north-east of their average locations in the south-west Pacific (Allan *et al.* 1996). As a result, associated flooding occurs in Peru and drought in Indonesia and Australia. Because of the wind changes, the sea-level drops in the west and rises in the east.

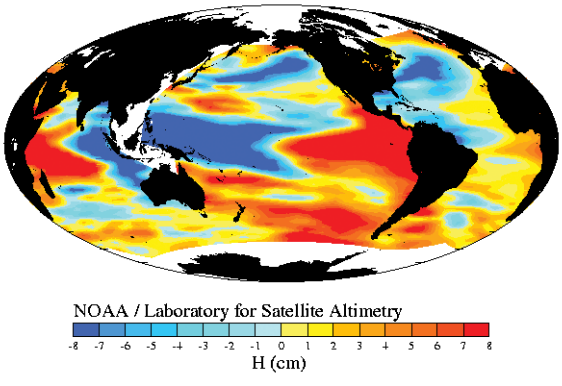


Figure 4: *Topex-Poseidon sea-level deviation, with respect to the period 1993–96, for winter 1997/98.*

Figure 4 shows the Topex-Poseidon sea-level deviations for the winter of 1997/98 when El Niño conditions were present in the Pacific.

Table 1 — Years of occurrence of warm (El Niño) events based on a 1 degC anomaly in sea surface temperature (from information supplied by the Met Office)

1877/78	1911/12	1965/66
1880	1914/15	1969
1885	1918/19	1972/73
1888/89	1925/26	1976/77
1891	1930/31	1982/83
1896/97	1939/40	1986/87
1899/1900	1941	1991/92
1902/03	1957/58	1994/95
1905/06	1963	1997/98

The eastward displacement of the atmospheric heat source overlying the warmest water results in large changes in the global atmospheric circulation, which in turn force changes in weather in regions far removed from the tropical Pacific. Table 1 provides a list of El Niño events from 1871 to 2000.

Consequences of El Niño

There has been a growing interest in using El Niño events in the equatorial Pacific Ocean for forecasting climate anomalies in different parts of the globe. Such linkages, called climatic teleconnections, are used by some countries to forecast impending weather-related problems and their impacts. El Niño events are now acknowledged to have global implications. During an El Niño event the regions of warm, moist air convergence are displaced. This change is transmitted round the world through upper-atmospheric processes leading to widespread shifts in the normal patterns of rain, temperature and wind. However, it is important to recognise that changes due to El Niño can still be swamped by other local events which are contrary to the expected El Niño signal.

During strong El Niño phases, the displacement of warm water in the Pacific (shown in Figure 3) causes anomalous convective activity over the central eastern Pacific, central western equatorial Indian Ocean, and off/near the Atlantic equatorial coast of Africa and north-western South America (Allan *et al*. 1996). Surface winds converge on to these regions bringing towering cumulus clouds and abundant rainfall. In contrast, over Indonesia, Australia, India and south-east Africa, drought conditions are usually experienced. The rainfall deficiencies vary in their timing.

The major El Niño event of 1982/83 caused severe drought over Indonesia. This affected the dry-season crop, and outbreaks of cholera related to the effect of drought on water supplies caused hundreds of deaths (Glantz *et al*. 1991). The skies over Indonesia and Malaysia were blackened during the recent 1997/98 event as smoke from forest fires swept across the region.

Due to the shift in the areas where there is heavy rainfall (called convergence zones), combined with low-level convergence of windflow, particularly evident through anomalous winds in the tropics, there is a compensatory divergence of upper-atmospheric winds away from the displaced convective regions (Allan *et al*. 1996). As a consequence, the jet streams tend to be displaced equatorward causing unusual weather patterns in the extratropics (Philander 1998).

The main impact of El Niño in the extratropics is felt during the winter months. During the last warm event of 1997/98, ice storms swept through eastern Canada during January 1998, forcing a trough of cold arctic air to cover the American east coast while a ridge of warm air moved northward as far as southern Ontario and Quebec. The unusually warmer weather in Canada caused temperatures to be high enough that freezing rain fell instead of snow, whilst in California the shift caused heavy rainfall.

In monsoon regions, such as India, it has long been recognised that with the influence of El Niño variations in the monsoon rains occur, usually failing during strong El Niño years. Tropical cyclone activity is also affected by El Niño. In general, warm episodes are characterised by an increased number of tropical storms and hurricanes in the eastern Pacific and a decrease in the Gulf of Mexico and the Caribbean Sea. The Australian/south-west Pacific shows a pronounced east–west shift of tropical cyclone activity with fewer tropical cyclones between 145° and 165° E and more from 165° E eastward across the South Pacific. There is also a tendency for tropical cyclones to originate a bit closer to the equator (NOAA 1998). In the north-west Pacific, Lander (1994) found that there was a reduction in the number of tropical storms plus typhoons during the El Niño years. He also found that the genesis region for tropical cyclones in the north-west Pacific shifts eastward during the warm phase.

There are regions where El Niño has no clear effect. Some regions may be far from the Pacific, or may have strong variability that is not related to El Niño. Both of these factors apply to Europe. A number of studies have been made linking possible El Niño effects on European climate, including those by Fraedrich and Müller (1992) and Moron and Ward (1998). There is a tendency during the winter season for low surface pressure occurring over western and central Europe to cause positive precipitation anomalies. There is an opposite tendency over northern Europe. The paths of storms travelling from the Atlantic sector to cross Europe may be shifted northward by El Niño (Fraedrich and Müller 1992). Figures 5 summarises the impacts usually caused by El Niño events.

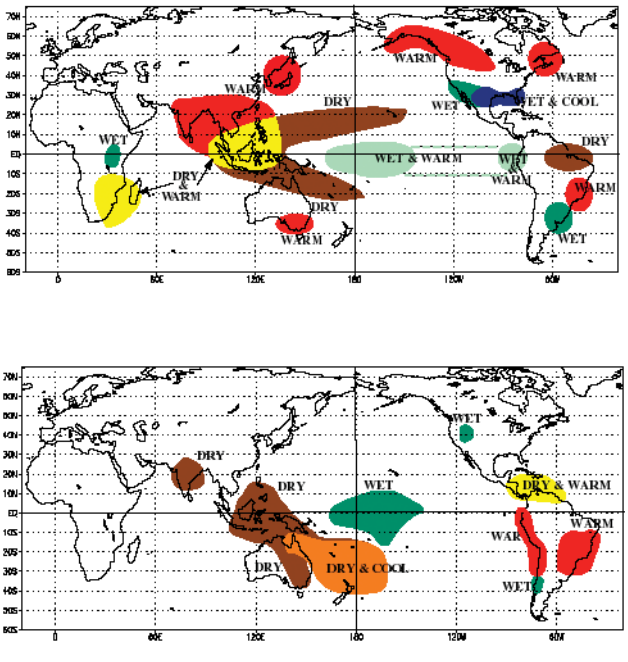


Figure 5: Warm episode relationships for December–February (above) and June–August (lower) (from NOAA)

Solutions

El Niño is a natural part of the complex ocean–atmosphere system. The phenomenon appears to be subject to self-sustaining periods and can therefore be predicted relatively easily. However, at times, random disturbances can excite it, such as westerly wind bursts, and prediction is not so straightforward, as scientists found out during the 1997/98 event.

Scientists use mathematical models to predict El Niño events. The most complete models aim to represent as wide a range of physical processes as possible. The results thus far, though by no means perfect, give a better indication of the climatic conditions that will prevail during the next one or two seasons. The progress within the last decade has been substantial. Scientists and governments in many countries are working together to design and build a global system for (i) observing the tropical oceans, (ii) predicting El Niño and other irregular climate rhythms, and (iii) making routine climate predictions readily available to those who have need of them for planning purposes (NOAA 1998).

We are still learning what an El Niño event can do. No two events are exactly alike so that their impact on worldwide ecologies and economies will also be dissimilar. Caution must be used in attributing any particular anomaly or impact to a specific El Niño because climate-related anomalies can also result from a variety of local and regional conditions, even in the absence of El Niño events. The atmosphere exhibits considerable variability on time-scales ranging from days to seasons to years. This variability often reflects little more than the normal chaotic behaviour of our atmosphere.

References

Allan, R., Lindesay, J. and Parker, D. (1996). El Niño — Southern Oscillation and climate variability. CSIRO, Australia

Fraedrich, K. and Müller, K. (1992). Climate anomalies in Europe associated with ENSO extremes. *Int. J. Climatol.*, 12, pp. 25–31

Glantz, M.H., Katz, R.W. and Nicholls, N. (1991). Teleconnections linking worldwide climate anomalies. Cambridge University Press

Lander, M.A. (1994). An exploratory analysis of the relationship between the tropical storm formation in the western North Pacific and ENSO. *Mon. Wea. Rev.*, 122, 636–651

Moron, V. and Ward, M.N. (1998). ENSO teleconnections with climate variability in the European and African sectors. *Weather*, 53, 287–295

NOAA (1998) http://www.cdc.noaa.gov/ENSO/

Philander, G. (1998). Learning from El Niño. *Weather*, 53, 270–274

Correspondence to: Miss C. Coghlan, 20 Cartmel Drive, Moreton, Wirral CH46 0TE.

© Royal Meteorological Society, 2002.

El Niño Outlook *

Current situation and outlook

During the first half of 2002, most forecasters were warning of an increased risk of an El Niño event developing during the year, though the degree of confidence regarding such a development varied somewhat among different expert interpretations. Three *El Niño Outlook* statements have previously been issued in 2002, forewarning of the onset of an El Niño event and seeking to track the evolution of conditions in the tropical Pacific and the range of expert interpretations on the likely developments. The last statement, issued 17 June 2002, reported a substantial rise in Central Equatorial Pacific sea surface temperature anomalies during late May and into June. This warmer than normal water has persisted to this point, and there is now agreement among forecasters that this represents the early phase of an El Niño event that is expected to persist for the remainder of the year and into early 2003.

Since late May, the sea surface temperature across much of the Central Equatorial Pacific has been about 1 degree Celsius warmer than normal. The climate system is currently feeling this warmth, and a tendency can be expected for climate patterns consistent with those associated with previous El Niño events. Since the warmth has been present since late May, it is probable that some atypical climate patterns observed since that time have at least in part been related to these changes in the tropical Pacific. These would include the unusual nature of the summer monsoon season across the Indian Subcontinent, notably the rainfall deficiencies in central and southern parts contrasting with excessive rainfall in the north-east, and the dry conditions over Indonesia and across large tracts of the Australian continent.

Most models and forecasters anticipate that the warmer than normal water in the tropical Pacific will be maintained through early 2003 at approximately the same level, i.e. about 1 degree Celsius above normal. While some further modest warming is also possible, conditions are not expected to reach the level of the last, very strong El Niño event of 1997/98, when sea surface temperatures in the central and eastern equatorial Pacific were several degrees above normal. However, while the current event is expected to remain less intense overall than the last event, conditions in the tropical Pacific are expected to be sufficiently anomalous to create substantial consequences in some regions. There is concern, for example, that the dry conditions that have developed over large areas of Australia in the past several months may be worsened by a persistence of the current event.

No two El Niño events are identical and the evolution of this event has to date had its share of distinguishing features. For example, the year began with abnormally warm conditions close to the tropical South American coast, which caused heavy rainfall, severe flooding and landslides in some coastal and near inland regions. This area of warm water, however, did not spread across the Pacific into a basin-wide El Niño event at that time. Furthermore, the warm water observed close to South America earlier in the year has now been replaced by cooler than normal water. Warm anomalies could, however, redevelop in the easternmost Pacific over the next few months, as historical records of previous El Niño events show occurrences of two peaks in the warming of surface waters in this area.

---

* *El Niño Outlook* dated 29 August 2002. Reproduced with the permission of WMO.

Home web site for the World Meteorological Organization: www.wmo.ch

Therefore, when considering response strategies, it will be important to consult National Meteorological Services for detailed interpretations of possible regional consequences of the current El Niño event. These interpretations will take into account that local and regional seasonal climate fluctuations may have many additional causes, involving patterns of sea surface temperature(SST) beyond the Pacific, and factors other than SST.

For example, regional climate fluctuations can be driven by SST patterns in the tropical Atlantic and tropical Indian Oceans. However, it must be emphasised that forecasts of SST patterns in these ocean basins currently have very limited skill. This is largely due to inadequate observations of conditions beneath the ocean surface, and the lack of understanding of the mechanisms of systematic SST changes in these ocean basins.

In summary:

- Sea-surface temperatures across the vast region of the Central Equatorial Pacific have been about 1 degree Celsius warmer than normal since late May.
- This pattern in the tropical Pacific, together with analysis of current conditions beneath the surface of the ocean and forecast projections from models, indicate that we are in the early stages of an El Niño event that will persist through to the end of the year [2002] and into the early months of 2003.
- The magnitude of the warming in the tropical Pacific may intensify to a modest extent over the coming months, but is not expected to reach levels that were experienced in 1997/98. Nonetheless, severe consequences in particular regions are likely.
- The area of warm water that had developed early over the easternmost equatorial Pacific, has now been replaced by cooler than normal water in the easternmost equatorial Pacific. However, historical records of previous El Niño events suggest that warm anomalies could redevelop in this area, although this is by no means certain. This emphasises the importance of consulting detailed interpretations of the expected climate anomalies and their possible effects on local weather, and not relying solely on the more general, historical tendencies on weather and climate associated with El Niño events.
- It is likely that some unusual climate patterns observed in the last two months [July and August 2002] could be related at least in part to the basin-wide El Niño that has now developed in the tropical Pacific. However, the climate system functions by integrating many factors in addition to El Niño. Thus it can be difficult in the case of this relatively weak episode so far to attribute to it with confidence individual abnormal climate patterns or weather events that have been observed in recent weeks in Pacific and Pacific Rim countries. This is certainly the case for the several abnormal weather events that have been observed further afield.

The situation in the tropical Pacific will continue to be carefully monitored and further advisories will be issued. More detailed interpretations of regional climate fluctuations are likely to be generated routinely by the climate forecasting community over the coming months and will be made available through National Meteorological Services.

Climate patterns in the Pacific

Research conducted over the past few decades has thrown considerable light on the important role played by interactions between the atmosphere and ocean in the tropical belt of the Pacific Ocean in altering global weather and climate patterns. During El Niño events, for example, sea temperatures at the surface in the central and eastern tropical Pacific Ocean becomes substantially higher than normal. During La Niña events, the sea surface temperatures in these regions become lower than normal. These temperature changes can drive major climate fluctuations around the globe and, once initiated, such events can last for 12 months or more. The last El Niño event occurred during 1997/98 and was followed by a prolonged La Niña phase that extended from mid-1998 to early 2001. El Niño events change the likelihood of particular climate patterns around the globe, but events are never exactly the same. Furthermore, while there is generally a relationship between the global impacts of an El Niño event and its intensity, there is always potential for an event to generate serious impacts in particular regions irrespective of its intensity.

Monitoring and forecasting the El Niño/La Niña phenomenon

The forecasting of Pacific Ocean developments is undertaken in a number of ways. Complex computer models project the evolution of the tropical Pacific Ocean from its currently observed state. Statistical forecast models can also capture some of the precursors of such developments. Expert analysis of the current situation adds further value, especially in interpreting the implications of the evolving situation below the ocean surface. All forecast methods try to incorporate the effects of ocean-atmosphere interactions within the climate system.

The meteorological and oceanographic data that allow El Niño and La Niña episodes to be monitored and forecast are drawn from national and international observing systems. The exchange and processing of the data are carried out under programmes co-ordinated by the World Meteorological Organization.

Acknowledgements

The preparation of this El Niño Outlook statement has been co-ordinated by the World Meteorological Organization as a contribution to the United Nations International Strategy for Disaster Reduction. It has drawn on contributions and support from the International Research Institute for Climate Prediction (IRI)*, Australian Bureau of Meteorology, China Meteorological Administration, National Institute of Meteorology and Hydrology of Ecuador, European Centre for Medium Range Weather Forecasts, Japan Meteorological Agency, Korea Meteorological Administration, National Institute of Water and Atmospheric Research in New Zealand, National Meteorological and Hydrological Service of Peru, United Kingdom Met Office, United States Climate Prediction Center (CPC) *, and the Climate Variability and Predictability (CLIVAR) Project of the World Climate Research Programme.

* CPC is a component of the National Centers for Environmental Prediction in the US National Oceanic and Atmospheric Administration (NOAA). IRI operates under a co-operative agreement between NOAA and Columbia University, and is further supported through other national and international sponsors.

Ship observations and the Met Office — a brief history

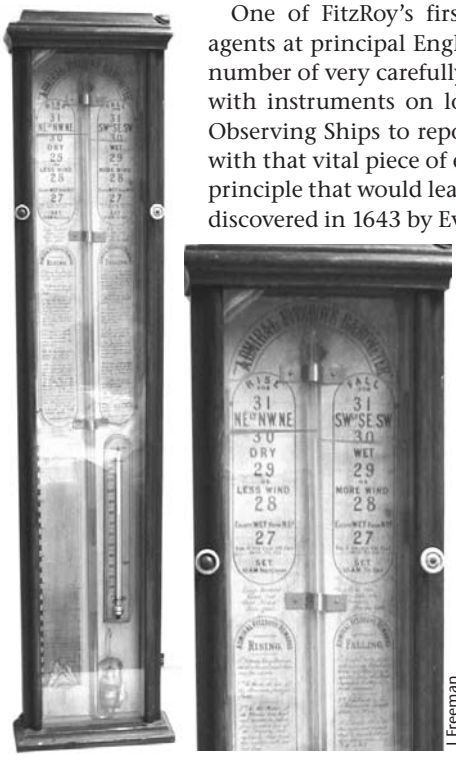
Introduction

This year marks the 150th anniversary of a landmark conference convened in Brussels in 1853 by Lt Mathew Fontaine Maury, USN. Regarded by many as the 'father' of oceanography, Maury was perhaps the first person to sense the existence of a global system of winds and currents, and subsequently published sailing directions which took account of them, so shortening considerably many hitherto lengthy voyages.

The Conference of Maritime Nations, which was attended by the principal maritime powers of the day, discussed, inter alia, the standardisation of meteorological and oceanographic observations from ships at sea. It also led more or less directly to the establishment, 20 years later, of the International Meteorological Organisation, the predecessor of the World Meteorological Organization (WMO), and laid the foundations for the meteorological and oceanographic operations of today.

The Meteorological Department

In 1854, as a result of the Brussels conference, a Meteorological Department for the United Kingdom was created within the Board of Trade, and Captain (later Vice-Admiral) Robert FitzRoy, RN, was appointed to oversee the running of it. His 'brief' was to arrange for the receipt of weather observations from ships.



J Freeman

One of FitzRoy's first actions was to appoint meteorological agents at principal English ports and, through them, a "...limited number of very carefully selected merchant ships..." were supplied with instruments on loan. These ships were the first Voluntary Observing Ships to report for the UK, but they were not supplied with that vital piece of equipment — the barometer. Although the principle that would lead to the development of the barometer was discovered in 1643 by Evangelista Torricelli (1608–1647), a mercury barometer that would be suitable for use at sea was not developed until the eighteenth century. The English scientist and instrument maker Edward Troughton was among the first to patent a design. Up to this point, FitzRoy had advocated the installation of a land barometer at every port, for the use of mariners about to set sail. The barometer did not become common at sea until 1855 when FitzRoy laid down guidance for its use. His accomplishments on behalf of mariners included the introduction of the first British storm warning service in 1861, making use of the electric telegraph; he is also credited with the invention of two types of barometer and coining the word 'forecast'.

Above: *One of the barometers designed by FitzRoy, showing weather characteristics which could be related to pressure readings.*

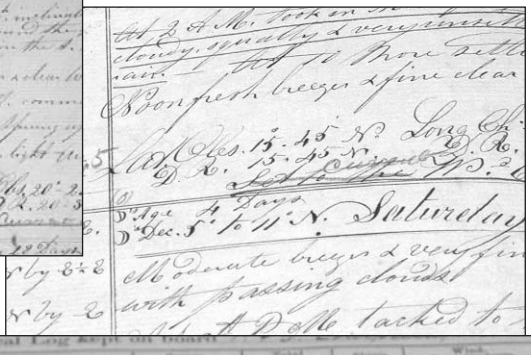
Further developments

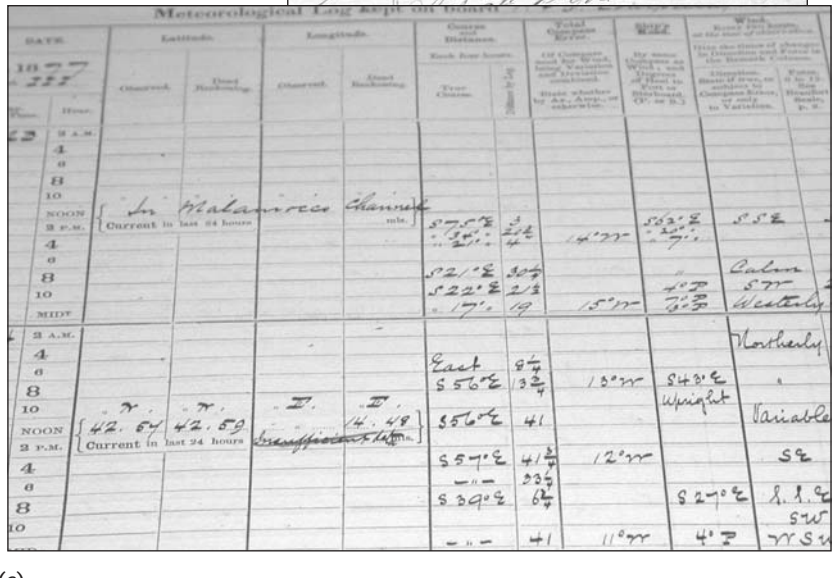
After the death of FitzRoy in 1866, it was determined that the then named Meteorological Office should be reorganised and, in 1868, its governing body became the Meteorological Committee. The purpose of the office was now to offer storm warnings to seaports; to procure data for marine charts of the weather; and to maintain a few standard observatories which would hold self-recording instruments. An annual grant was made to meet the expenses of the new committee. This arrangement worked well for several years until it was felt that the scope of the Meteorological Committee should be enlarged.

Early developments in weather reporting formats

(a)

(b)





National Meteorological Library and Archive

(c)

Above: *Prior to the development of organised observations from ships, meteorological logs were rather haphazard affairs, as in the examples at (a) and (b), from 1839. Following the introduction of a structured pattern for taking weather observations, ships' meteorological logbooks began to take on a more recognisable format. In (c) above is an example of a log from 1877.*

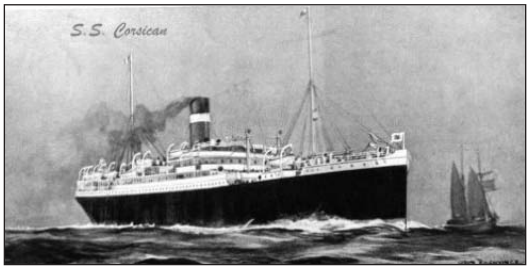
The Meteorological Council

Another reorganisation followed, establishing the Meteorological Council. One project, undertaken early after the formation of the council, investigated the currents around the Cape of Good Hope and west coast of South Africa. Another collated observations that had been submitted by ships since 1854; the resultant charts of meteorological data being of tremendous assistance to shipmasters. Like Maury several years earlier, they could use the information to substantially reduce passage times, while also increasing their understanding of meteorology. The compilation of charts continued such that, by 1901, they were being issued gratis to observing ships on a monthly basis, initially covering the North Atlantic but later including charts for other oceans.

Past ships of the United Kingdom Voluntary Observing Fleet

Crown Copyright

Above: *s.s.* City of Calcutta *(1903, American & Indian Line).*



TheShipList
www.theshiplist.com

Above: *s.s.* Corsican *(Allan Line) TheShipList (www.theshiplist.com)*

Reports and weather information by radio

In the meantime, Marconi's experiments with radio transmissions in 1897 led, in 1900, to the construction of a radio station at Poldhu (Cornwall, United Kingdom), and the birth of long-range communications in 1901. (See *The Marine Observer*, 2001, 25)

The Meteorological Office made use of this technology by inaugurating in 1909, on transatlantic liners only, a weather reporting system using wireless telegraphy (W/T). The first merchant ship to send a weather report by W/T was the s.s. *Corsican*, on 10 January 1909. By 1911, ships' data were being used as input to gale warnings that covered not only UK coastal waters, but also the North Atlantic.

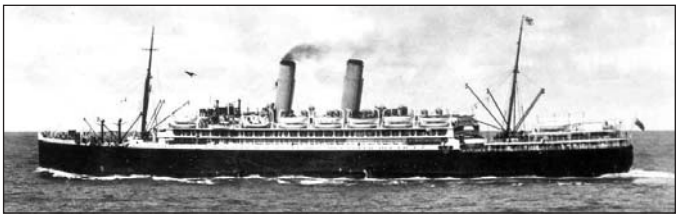
Passing information to mariners

With meteorological agents so far being shipmasters' only point of contact with matters meteorological, steps were taken to put this liaison on a more official footing in 1921 when the first official UK Port Met. Officer was appointed, in Liverpool. This would be the forerunner of the network that still exists today.

In January 1924, production of a monthly publication for the UK's recruited ships was started. With safety of navigation uppermost in its aims, it was the means by which the monthly meteorological charts could be distributed to seafarers, but also included advice and information about navigational hazards such as wrecks and icebergs. Ships' Radio Officers were also advised of news and developments relative to their work. As a contribution to the common good, seafarers also reported to the Meteorological Office about weather hazards such as storms, and oceanographic information such as currents and tide rips. The title of the publication was *The Marine Observer* and, as is still the case today, it was issued free of charge to ships of the Voluntary Observing Fleet (VOF)as a gesture of thanks for their observing work.

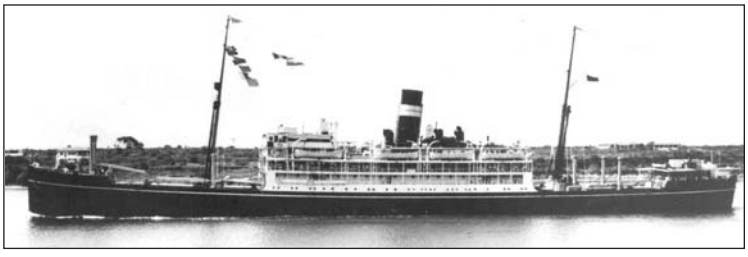
The observing fleet at this time comprised 120 merchant ships equipped with instruments on loan from the Meteorological Office. These ships recorded weather observations in special journals at four-hourly intervals, whereas all other ships in the fleet used their own instruments which were checked by a Port Met. Officer, or agent. The total number of ships was capped at 500 to ensure that shore-based marine staff could continue to cope with the volume of journals and logsheets being returned.

Past ships of the United Kingdom Voluntary Observing Fleet



Crown Copyright

Above: *s.s.* Ormonde *(1917, Orient Line) .*



Crown Copyright

Above: *s.s.* Mulbera *(1922, British Indian S.N. Co. Ltd)*

The war years 1939–1945, and aftermath

By 1939, the number of ships carrying loaned equipment was limited to 360, and became known as 'Selected' ships. However, a further 635 were reporting in a shortened version of the Ships' Code, and were classified as 'Supplementary' ships. In the interests of security during the years of World War II, the transmission of weather reports from ships was suspended, as was publication of *The Marine Observer* (which would be resumed in 1947). Nevertheless, Port Met. Officers and agents managed to maintain links with the fleet where possible, and weather observations resumed soon after hostilities ceased. Of the 995 ships involved with weather observing before the war only 480 (272 Selected ships and 208 Supplementary ships) resumed their work afterwards, the remainder having been lost to the consequences of war. With the airwaves now safe, transmission of ships' weather reports via radio also resumed.

Past ships of the United Kingdom Voluntary Observing Fleet

Crown Copyright

Above: *s.s.* Port Chalmers *(1933, Port Line. Pictured here in the 1960s).*

Crown Copyright

Above: *s.s.* Glenorchy *(1947, built as* Priam *for the Blue Funnel Line. Pictured here in 1948 having been transferred to the Glen Line).*

Post-war progress

The number of Selected ships in the UK Voluntary Observing Fleet was allowed to grow to 500 in the post-war years, with observations being received from ships trading worldwide. As trade recovered during the 1950s and 1960s, ships working from the UK to far-flung corners of the globe ensured wide and comprehensive coverage of meteorological events, with observations being transmitted at main synoptic hours to participating coastal radio stations. From these sites, the data were passed to what are now known as National Meteorological Centres. The future development of the Global Telecommunication System would ensure speedy transfer of data between centres.

Most ships returned to the UK at frequent intervals, thus allowing Port Met. Officers to check or replace the meteorological instruments as required and update observers with news and developments concerning their weather observing activities.

The mid-1960s also saw the commencement of upper-air soundings from UK merchant ships; this subsequently gave rise to the UK Automated Shipboard Aerological Programme in the 1980s.

The Meteorological Office was by now closely associated with the Royal Air Force, there being land-based observing staff at most RAF stations. The marine activities originally headed by FitzRoy had now become a branch of it going by the name of the Marine Division.

---

* *Editor's note*. See *The Marine Observer*, 2000, 108.

The Ocean Weather Ship service

The Ocean Weather Service was formed to serve the post-war increase in transatlantic air traffic. It also helped fill the void in observations left by the loss of so many merchant ships. Thirteen weather stations in the North Atlantic were to be established under the International Civil Aviation Organisation/North Atlantic Ocean Station Agreement of 1946. The Met Office used converted 'Flower' class corvettes, and 'Castle' class frigates to man those stations for which the UK was given responsibility.

A reduction to 10 stations was made in 1949, with a further reduction to nine in 1954. From this point the number of stations was slowly reduced until, at the termination of the above agreement in 1975, only four were still operational. A new agreement with WMO, ratified in 1976, left the UK responsible for station 'Lima' (57° N, 20° W). Figure 1 shows the initial network of stations as defined by the 1946 agreement and those remaining in 1976. (See *The Marine Observer*, 1996, 201.)

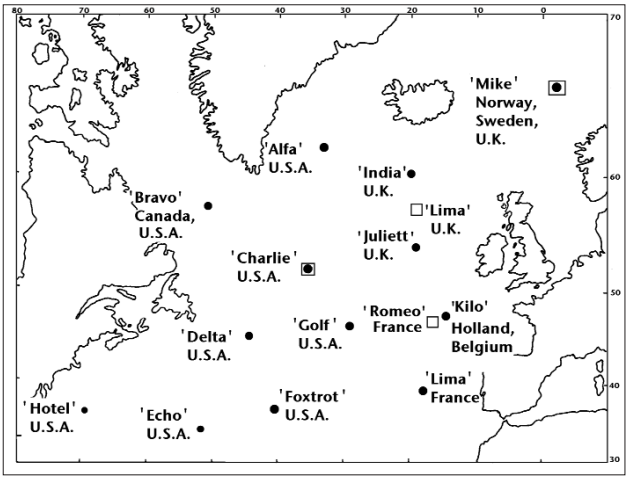
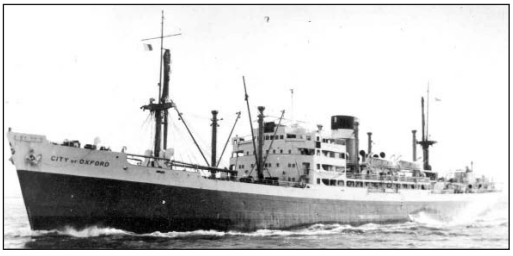


Figure 1: *North Atlantic weather ship network in 1946 and 1975 (stations agreed in 1975 are indicated by squares). Those nations responsible for each station are as shown.*

Above: Starella *hands over to* Cumulus *for the last time, on 18 November 1985.*

The old naval ships finally reached the end of their useful lives in 1982. The Met Office then ceased direct management of its own weather ships but instead manned a converted stern trawler — the *Starella*. However, two ships were needed to give 'Lima' continual coverage, so it was manned jointly by the *Starella* and the purpose-built weathership — the *Cumulus*. The *Starella* continued in service until 1986 when it was decommissioned and returned to its owners Marr Vessel Management Ltd, Hull. The *Cumulus* was originally operated by the Dutch meteorological service, and subsequently transferred to Met Office operation. When the UK ocean weather service ceased in 1996, the *Cumulus* was returned to its former Dutch owners.

Past ships of the United Kingdom Voluntary Observing Fleet



Crown Copyright

Above: *s.s.* City of Oxford *(1948, Ellerman Line).*

Crown Copyright

Above: *s.s.* Raphael *(1953, Lamport & Holt Line)*

The 1970s onwards

The 1970s saw the advent of containerised freight which resulted in many ships spending long periods away from home waters. This, coupled with new methods of ship management where ships could be — and were — frequently transferred to other flags had its drawbacks for the marine branch of the Met Office. The 'windows of opportunity' in which to recruit ships while in home ports were reduced, while a further consequence was that crews with little or no experience of weather observing could find themselves posted to observing ships. Training therefore became an important aspect of Port Met. Officers' work. Through co-operation with their international colleagues they also ensured that ships spending more prolonged periods away from the UK could be kept supplied with equipment and stationery (held by overseas Port Met. Officers on behalf of the Met Office), and inspected if required.

Mutual co-operation on these lines maintained the flow of many thousands of ships' observations which regularly poured in from UK Selected and Supplementary ships, the UK trawler fleet, ships using the MARID code, and others using a much reduced form of the Ships' Code (SHRED), and light vessels.

Changes on land and at sea

In 1983 a new version of the ship code was introduced, and Port Met. Officers were heavily involved in guiding observers through the changes. As forecasting and research techniques became ever more sophisticated, the emphasis regarding ship data began to veer more towards quality than quantity. Forecasting now demanded accuracy — a single accurate observation would be of more use than several that might be flawed.

Advances in ships' automated technology, and further changes in manning practices led to a reduction in the numbers of ships' staff able to undertake observing work. Allied to this was a downturn in the UK shipping industry which saw many companies either cease to trade, or instead place their ships under third-party management, making it difficult to promote weather observing at sea.

Crown Copyright

With a growing need for marine data, some automation of weather reporting became necessary. A Meteorological Observing System for Ships (MOSS) was installed on many ships during the 1990s. MOSS ensured the timeliness of ships' weather reports as observations were automatically transmitted to satellite at pre-determined times. A MOSS unit with its data-collection equipment is shown (left).

At the same time the Dutch meteorological service was developing its 'Turbo' software (since evolved the windows-based program TurboWin which is being gradually phased into the UK VOF*). Observers could now key weather data directly into an onboard computer which automatically executed quality control checks on the data prior to transmission.

The gradual introduction of the Global Maritime Distress and Safety System between 1992 and 1999, requiring the use of Inmarsat satellite systems, had a profound effect on the transmission of ships' weather of observations and on the provision of Maritime Safety Information. In particular it led to the closure of many of the coast radio stations that had previously been the primary route for submitting ships' weather observations

Current status

Today the UK Voluntary Observing Fleet comprises approximately 425 Selected ships and further 33 fixed and mobile offshore installations reporting in the full ship code, with Auxiliary ships and MARID ships (51 in total) transmitting limited observations. Upper-air observations are now made by only one dedicated UK ASAP ship. Data from all these ships are assimilated into computer models from which are derived meteorological products for a variety of users, not least of which are seafarers.

The automation of ships' observing systems and instrumentation will probably increase in the future, continue to evolve into ever more sophisticated systems. It also cannot be denied that sensor observations acquired from satellites are certainly very useful to the shore-based forecaster. However, Voluntary Observing ships and observers will still have an important role to play. Timely and accurate data are vital to forecasters, for research into weather and climate, and for verifying that the satellites are actually getting it right!

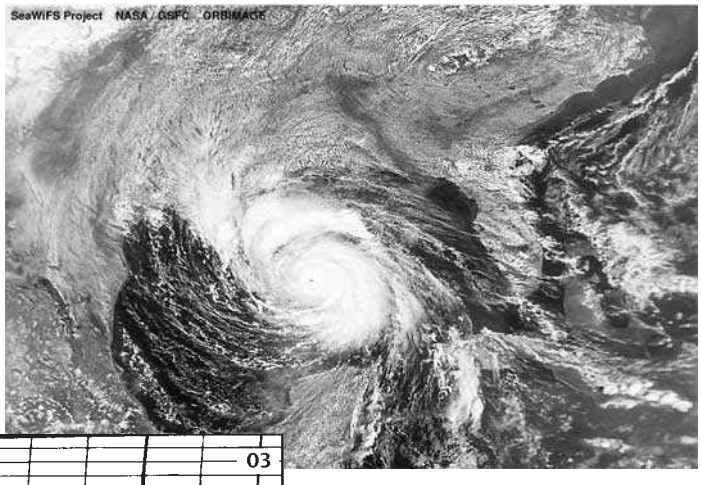
Acknowledgements

The help of the following is greatly appreciated: Captain E.J. O'Sullivan (Manager, Marine Networks at the Met Office); the National Meteorological Library and Archive; and TheShipsList (www.theshipslist.com).

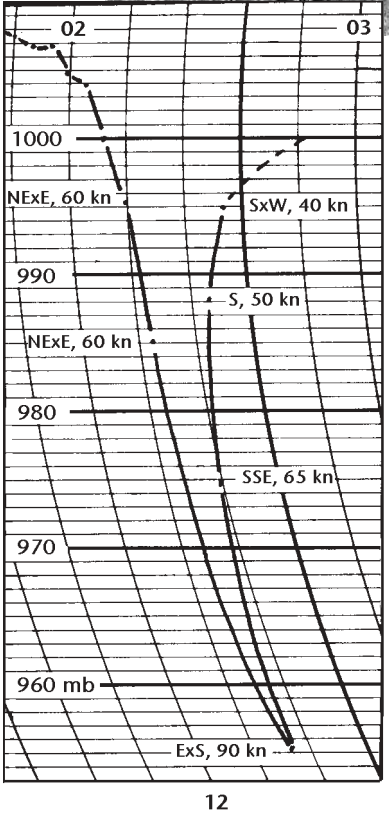
* *Editor's note*. See *The Marine Observer*, 2002, 184, for more about TurboWin.

Hurricane ‘Lili’ whisks the Gulf of Mexico

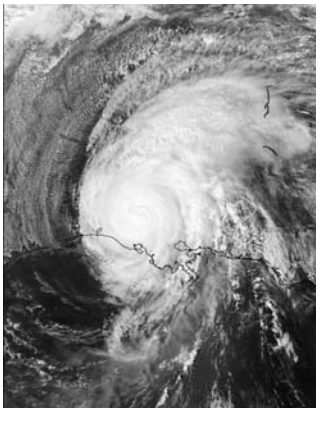
At the beginning of October 2002, hurricane Lili was making its presence felt in the Gulf of Mexico. The satellite image below was taken at 1430 (Eastern Time) on 2 October, showing the Category 4 storm at the height of its powers, with an eye just visible.



NASA SeaWiFS Project and Orbimage



A moored buoy (42001), maintained by the US in position 25.9° N, 89.7° W, lay in the path of the storm. As Lili passed, the buoy continued its hourly data transmissions, and the resultant pressure changes (together with wind data) have been transcribed to a marine barograph sheet (UTC, shown left). The image below was taken on 4 October by which time Lili had crossed the Gulf Coast of the US, and had been downgraded to a tropical storm.



Courtesy of Jacques Descloitres, NASA GSFC

Postbag

Species-spotting in Biscay

Sir, during the *Hebridean Spirit's* crossing of the Bay of Biscay on 16 and 17 September 2002, we observed so many bird species that I have asked the guest speaker on this voyage, Mr Tim Earl, to write a short précis of our observations for you (see below).

The ship was on passage from Poole to Lisbon, and the observers were Captain M. Dexter, Chief Officer S. Moore, Tim Earl and passengers.

Voyage notes by Tim Earl *

The *Hebridean Spirit* is sister ship to the *Hebridean Princess*. The latter cruises the Scottish islands while the 'Spirit' has a world-wide international cruising programme. On this trip about 60 passengers were on board, 15 short of a full complement.

We were to record birds from far and wide, insects and dolphins, over the next 48 hours. Greater and sooty shearwaters were seen on their way to breeding grounds in the South Atlantic, while Sabine's gulls from the eastern Arctic Ocean had arrived for the winter.

Balearic shearwaters, which shot past the ship on feeding runs from the Mediterranean, met manx shearwaters from the Welsh islands on a similar quest. Great skuas (bonxies) from Shetland chased Arctic, common and sandwich terns in the hope of a hot meal. Bonxies harassed terns with the tenacity of 'doorstep' salesmen, and caused them to regurgitate the contents of their stomachs in a desperate attempt to get rid of their pursuers.

Cory's shearwaters from nearby Spanish and Portuguese islands were seen, almost the same size and colour as the juvenile gannets which had recently left their colonies on Ortac and Les Etacs off Alderney.

The ship also became a temporary home for stowaways such as a male blackcap which huddled in a coil of rope on one of the lifeboats. Three species of wagtail were seen flying around the ship — grey, pied and yellow. Indeed, pied wagtails were seen on four occasions while the grey wagtail lived up to its normal habit by running around the edge of the swimming pool. A northern wheatear was seen by many passengers who noted that it had a white rump. It is this feature which gave the bird the old country name of 'white-arse', corrupted to wheatear by prudish Victorian birdwatchers.

A spotted flycatcher, like the other small birds on its way to Africa for the winter, caught a good feed of insects attracted to the lights the night before. And, writing of insects, we saw two red admirals (butterflies, not Russian naval officers) migrating south, while a red-veined darter (a dragonfly) committed suicide in the ship's swimming pool.

A few common dolphins were recorded close to the ship, and two pilot whales were seen briefly on day one. No — there is more to Biscay wildlife than gulls and kites!

From Captain Mark Dexter, Master m.v. *Hebridean Spirit* (Hebridean Princess Cruises)

---

* Tim Earl is a retired journalist who now leads wildlife tours. The report is published with his permission.

Book reviews

Endeavour, The Story of Captain Cook's First Great Epic Voyage by Peter Aughton. 197 mm x 253 mm, *illus*., 255 pp. inclusive. Published by Cassell & Co., Wellington House, 125 Strand, London WC2R OBB. ISBN: 0 304 36236 0. Price: £20.00

This is not the first book to chronicle the first great voyage by James Cook, but the style incorporates the occasional use of the explorers' original text to produce an excellent insight into how they viewed their discoveries. Initially it was the wish of explorer and scientist Alexander Dalrymple to lead a new expedition to the South Seas to discover and chart the great southern continent, but the idea foundered until the Royal Society also decided to send a ship to the South Seas for astronomical observations. The Admiralty considered Dalrymple unsuitable to lead the expedition and, after much thought, selected Cook.

Cook had his own very individual ideas on discipline, drink and scurvy — he was possibly the first shipmaster to fully contain scurvy, losing not a single man to the disease. This to him was a major achievement, for the loss of men to other reasons such as drink, epilepsy, and consumption, etc. were seen as part of normal ship life.

His approach to native peoples was generally friendly, but notably at Tahiti the natives themselves were particularly genial, and a surplus of friendly women led to breaches of discipline requiring the use of the lash amongst the crew. Adept pilferers, the natives caused Cook a problem when astronomical instruments went missing. It took considerable effort to recover them and, reluctantly, Cook needed arms to restore order. Pilfering mainly ceased but relations were never quite as good again. At neither New Zealand nor Australia were similar friendly responses found among the natives, and the Aborigines especially surprised Cook by soon discarding as useless the baubles so prized by other peoples — their interest lying only in food.

The most desperate point of the voyage came on the eastern shore of Australia. The Great Barrier Reef was totally uncharted and, as Cook discovered, the lead line did not warn of the reef in all circumstances. The *Endeavour* was close to sinking having struck the reef, but was luckily hauled off by the crew who contained the leak with pumps and used a sail to patch the hole until they could beach her and make repairs.

The journey home was via the Dutch outpost of Batavia on Java. The port almost ended the voyage for although full repairs were made to the ship with the aid of Dutch shipwrights, disease was rife — malaria and dysentery decimated the crew. Eventually, at Cape Town, more hands were found for the remainder of the voyage.

Well illustrated with drawings and sketches made during the voyage, the book also holds a full catalogue of the astronomical observations made. Mention too is made of the logs and journals which were kept, with emphasis on the botanical side of the voyage studied by Joseph Banks, of the Royal Society. When *Endeavour* returned home, the holds were packed with natural history specimens of all kinds, never mind his journals and drawings made during the three-year voyage. In conclusion, this is a fine book interspersed with sufficient illustrations to keep the imagination fired. It is both a great adventure, and a fine scientific exploration — worthy of any bookcase.

D. Ogle

Met Office, Edinburgh

Riders of the storm, The Story of the Royal National Lifeboat Institution by Ian Cameron. 195 mm x 250 mm, *illus*., 250 pp. inclusive. Published by Weidenfield & Nicholson, The Orion Publishing Group Ltd, Orion House, 5 Upper Saint Martin's Lane, London WC2H 9EA. ISBN: 0 297 60790 1. Price: £20.00

Many books have been written about the Royal National Lifeboat Institution, but in *Riders of the Storm* Ian Cameron has skilfully woven together all aspects of its history. In the earliest days, shipwrecks were more likely to be viewed as an opportunity for plunder rather than for aiding those in peril. Nevertheless, countless rescues are beautifully illustrated and graphically retold — putting the reader at the scene. To put to sea in a rowing or even a sailing boat, in the conditions which usually prevailed during shipwrecks, demanded courage of the highest order. The book traces developments in lifeboat design and cost from those boats, through early experiments with self-righting craft, to the 'inflatable' of today and hovercraft of tomorrow. Improvements in communications and accuracy in meteorology were also needed; these, the Beaufort wind scale, and the need for barometers on ships are also covered.

There is no doubt about the effect of two world wars on shipping and the lifeboat service. How difficult navigation must have been without the aid of illuminated buoys, and lights on shore! Ian Cameron served in the Fleet Air Arm during the Second World War when RNLI crews comprised those 'too' old for war service. Nevertheless, those same crews rescued thousands from the beaches at Dunkirk.

The author describes the most important part played by women who helped with the early rescues and launchings, and of the work of horses too. In later years tractors replaced horses, and the women formed guilds, organising street collections which, together with legacies are the lifeblood of the service. Women are also members of lifeboat crews nowadays.

The families of lifeboat crews are given their rightful place in the history. Bereaved, heartbroken and often destitute they were the reasons, along with the need for boats and an organised rescue service, for early philanthropists to found the institution now known as the RNLI. The commitment made by the highly trained crews, their wives and families is illustrated by the loss of the Penlee boat and her crew. Technical skill and seamanship call for the total dedication of a lifeboatman's life.

The change in emphasis of rescues is neatly documented; in the past, most rescues took place in the bad weather of winter and usually involved shipping of various kinds. Today the busiest times are the summer months and rescues involve people bent on pleasure. Without lecturing, the author highlights the scant respect for the sea — an alien and, at times unforgiving environment — shown by some of those rescued.

No reader of Ian Cameron's brilliantly composed book can fail to admire the work of the RNLI. Despite the insertion of 'fact boxes' in rather inappropriate and sometimes distracting places, it is a most enjoyable book that would be an asset to any ship's library or landlubber's coffee table, and a fundraiser through its sales for a most worthy cause.

A. Eastham

Port Met Office — Edinburgh

Note. Readers can buy copies of *Riders of the Storm* (rrp £20.00) for the special price of £15.00 (free postage and packing, UK only) by calling +44 (0)1903 828 503 and quoting reference JARS.

Noticeboard

Awards to UK Voluntary Observers and ships

In the October 2002 edition of this journal we published the names of observers and ships associated with awards for 2001. The lists included nominees for annual 'Excellent Awards', to whom letters of notification were sent in August 2002.

Below are the names of those observers who have not claimed their Excellent Awards (the names of Masters are shown in bold face). All officers are advised to check whether their names appear. If listed, but notification has not been received, then those concerned are asked to contact us * with an address to which the award may be sent.

Ambusaidi, KS
Amo, JD
Anand, PS
Andrews, TA
Augustine, B
Ayyar, S
Azarcom, B
Bamford, CR
Baranowski, P
Bennett, K
Blacker, NJ
Blythe, NE
Bongat, G
Bradbury, Dr P
Brown, PW
Bryson, GW
Caminong, AP
Canete, RM
Caparaz, DY
Carvhalo, L
Chase, SC
Chin, CY
Christensen, J
Cinco, JM
Clemente, JB
Contreras, C
Corder, C
D'Abreo, JMS
D'Arcy, R
Dajay, R
De Los Santos, M
Degollado, R
Devarpalli, PS
Diskin, D
Dominguez, AC
Eleria, WC
Ellis, AW
Espanola, R
Famaloan, R
Fardey, D
Fergusson, MW
Fraser, S
Gawad, A
Genovese, G
Gerona, EC
Gesulgon, J
Ghuman, PS
Gonzaga, OB
Gopal, M
Gustilo, R
Hadfield, DP
Hapitan, NL
Heald, J
Jackson, JW
Kalagayan, W
Khan, M
KIlroy, R
Kotkavoori, T
Krzysztof, J
Lanckay, R
Lasheer,
Legaspi, ND
Likiyan, J
Lloyd-Smith, M
Mansuelo, A
Manuel II, FA
Marr, D
Mathews, S
McCarthy, J
Mehendale, AV
Merwyn, S
Michalik, L
Miley, PA
Moody, MJ
Moraes, F
Munaweera, M
Narayanan, J
Necretales, RA
Neelemaat,–
Nonesco Jr, H
Oblea, O
Oriatto, J
Paceno, RA
Pacis, RA
Partridge, CE
Peiris, K
Perkins, M
Plisenko, A
Prabhakar, AK
Quiambao, R
Rizvi, N
Rojesh, S
Rontoro, R
Saludez, R
Samaranayake, C
Sanderson, RJ
Scarrott, A
Senador, P
Sepe, JR
Seprick, KD
Singh, VP
Smith, KR
Smith, M
Son Jr, GF
Syrytsky, S
Tampus, JAD
Tayag, C
Tebutt, W
Tenazas, E
Thapa, D
Tudor, SB
Twitchin, SD
Valles, PS
Varghese, KG
Vibar, P
Villacorte, EL
Walker, CG
Watson, C

* Claims may be e-mailed to obsmar@metoffice.com, faxed to +44 (0)1344 855873, posted to the address given inside the front cover of this edition, or forwarded through any UK Port Met. Office.

Updates to the fleet lists published in *The Marine Observer*, July 2002

United Kingdom

Selected Ships

Recruited:

Amer Whitney
Berge Arctic
British Endeavour
CSCL Dalian
CSCL Felixstowe
CSCL Ningbo
Canelo Arrow
Contship Aurora
Coral Princess
Eastern Fortune
Elizabeth Schulte
European Ambassador
Golden Princess
Hurst Point
LNG Rivers
LNG Sokoto
Olympia Spirit
S.A. Altius
Saga Crest
Sarah
Star Inventana
Stolt Durham
Sun Princess
Tyco Resolute

Withdrawn:

Alam Selaras
Arctic Goose
British Skill
British Spirit
British Strength
British Success
Harmane Spirit
Havjarl
Licorne Pacifique
Mairangi Bay
Northern Horizon
Northern Prince
Palliser Bay
Pegasus Bay
Press
Pride of Cherbourg
Pride of Hampshire
Resolution Bay
St Clair
St Sunnniva
Seabourn Sun
Union Emerald
Western Bridge

MARID

Withdrawn:

Arco Dee
Crescent Highway
Whitcrest

Fixed or mobile offshore stations

Withdrawn:

GlobalSantaFe Grand Banks
GlobalSantaFe Rig 135
Sedco 706

Auxiliary

Recruited:

New Resolution
Saga Voyager

Withdrawn:

Endeavour
State of Manipur

Fleet list updates (contd)

Australia

Selected Ships

Recruited:

Bunga Teratai
Bunga Teratai Dua
Cape Conway
Capitaine La Perouse
Capitaine Tasman
Direct Kestrel
Global Myth
Magnavia
Sam Ratulang

Withdrawn:

Capitaine Fearn
MOL Waratah
MSC Indonesia
MSC Kiwi
OOCL Australia
Pathfinder II
Tavake Oma

Supplementary

Recruited:

Leeuwin II

Auxiliary

Withdrawn::

Geo Arctic

India

Supplementary

Recruited:

Dev Pryag
Gem of Ennore
Jag Rani
Palanimaleai
Radiant Rigel

Withdrawn:

Jag Rashmi
Mizoram
Skandy Surveyor
Tulsidas

Auxiliary

Withdrawn:

Asean Glory
Giorges Hafez

New Zealand

Selected

Recruited:

Forum Fiji

Withdrawn:

Capitaine Wallis II
P&O Nedlloyd Tauranga
Sofrana Kermadec
Sydney Express

Corrections

The Marine Observer, October 2002 — page 182:
Captain J.L. Petersen should read Captain J.L. Peterson.

The Marine Observer, October 2002 — page 183:
Entry for shipping company 'No. 39' should read OSG Ship Management (UK) Ltd

Our apologies for these oversights.

UK Port Met. Office network

South-east England

CAPTAIN HARRY H. GALE MET OFFICE TRIDENT HOUSE 21 BERTH TILBURY DOCK
TILBURY ESSEX RM18 7HL
TEL: +44 (0)1375 859970 **FAX: +44 (0)1375 859972**
E-MAIL: pmolondon@metoffice.com

Bristol Channel

CAPTAIN AUSTIN P. MAYTHAM MET OFFICE TITAN HOUSE RM 107
CARDIFF BAY BUSINESS CENTRE LEWIS ROAD OCEAN PARK
CARDIFF CF24 5BS
TEL: +44 (0)29 2045 1323 **FAX: +44 (0)29 2045 1326**
E-MAIL: pmocardiff@metoffice.com

South-west England

CAPTAIN JAMES M. ROE MET OFFICE 8 VICEROY HOUSE
MOUNTBATTEN BUSINESS CENTRE MILLBROOK ROAD EAST
SOUTHAMPTON SO15 1HY
TEL: +44 (0)23 8022 0632 **FAX: +44 (0)23 8033 7341**
E-MAIL: pmosouthampton@metoffice.com

East England

CAPTAIN JOHN STEEL MET OFFICE CROSSKILL HOUSE MILL LANE
BEVERLEY HU17 9JB
TEL: +44 (0)1482 867226 **FAX: +44 (0)1482 868116**
E-MAIL: pmohull@metoffice.com

North-west England

COLIN B. ATTFIELD MET OFFICE 8 TOWER QUAYS TOWER ROAD
BIRKENHEAD CH41 1BP
TEL: +44 (0)151 6490541 **FAX: +44 (0)151 6490547**
E-MAIL: pmoliverpool@metoffice.com

Scotland

PORT MET OFFICE MET OFFICE 5 SAUGHTON HOUSE BROOMHOUSE DRIVE
EDINBURGH EH11 3XG
TEL: +44 (0)131 528 7305 FAX: +44 (0)131 528 7345
E-MAIL: pmoedinburgh@metoffice.com

Offshore Adviser (Aberdeen)

IAIN J. HENDRY MET OFFICE DAVIDSON HOUSE CAMPUS 1
ABERDEEN SCIENCE & TECHNOLOGY PARK BRIDGE OF DON
ABERDEEN AB22 8GT
TEL: +44 (0)1224 407557 **FAX: +44 (0)1224 407568**
E-MAIL: ihendry@metoffice.com